MARCH 1957
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FOOD ENGINEERING

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Key factor in pacesetting progress of Campbell Soup Co. (p. 68) is the research exemplified here. It ranges from agriculture to nutrition.

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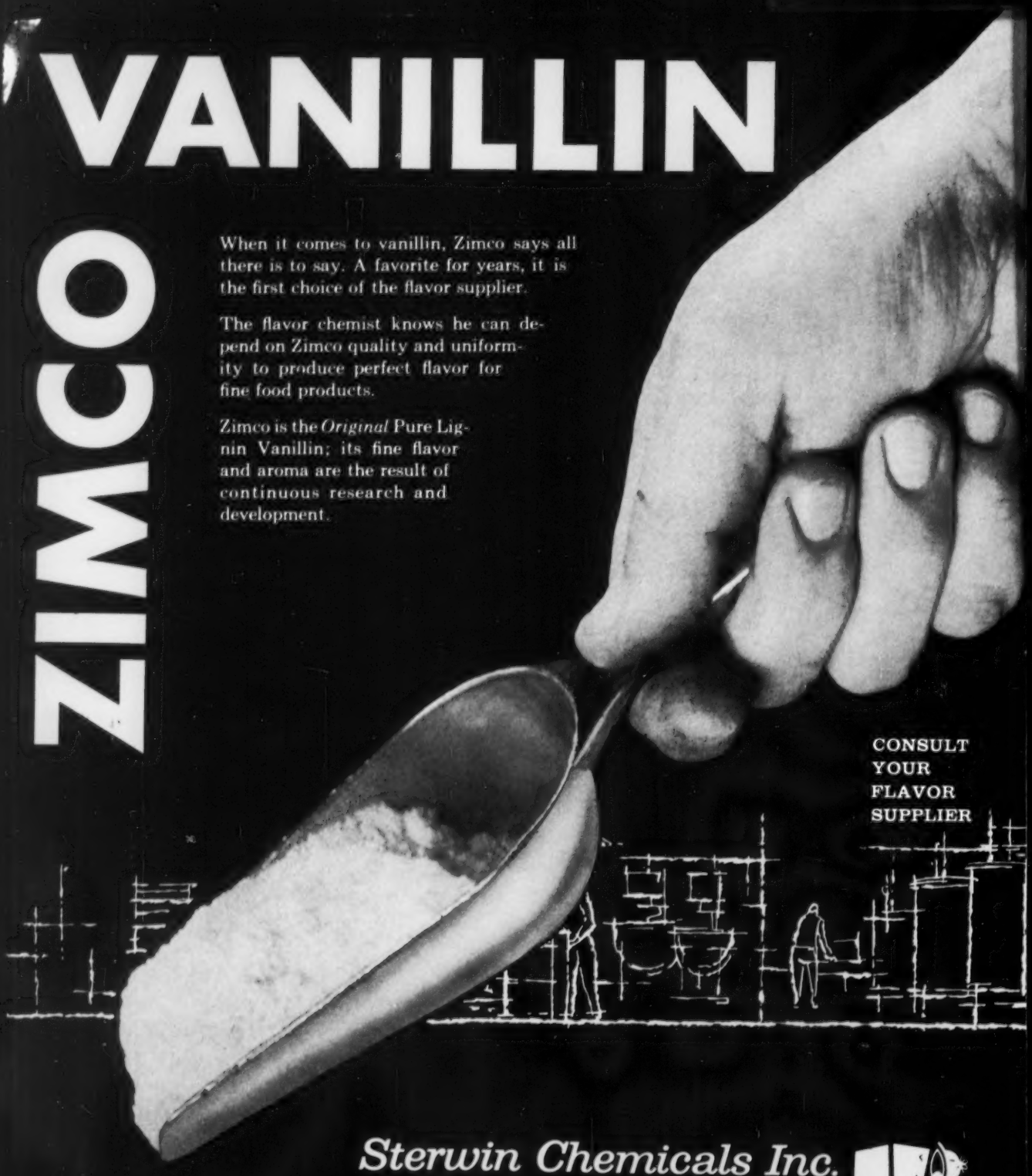

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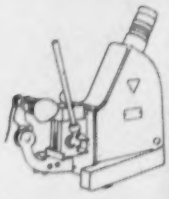

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Here's "Havie" Havighorst

You see him in action—pen poised over notebook as he intently observes a food plant innovation in operation. You will see it through his eyes in a future issue of FOOD ENGINEERING. But we will tell you this much now: It's a new type of sanitary valve, pneumatically actuated and pushbutton controlled.

Havie is continually turning up advanced equipment and methods during his travels as FE's western Editor. This one he found on a recent trip through the Pacific Northwest. After attending the inaugural meeting of Northwest Canners & Freezers Assn., he went on to inspect food plants in the area for story subjects.

No swivel chair editor, he. Havie's territory is eleven Western states. It keeps him moving to find, evaluate, and describe the management and engineering advances in this important area. He spends half his time carefully inspecting plants or fine-combing conventions. And last year, to obtain advance information to present to you through the pages of FE, he traveled 6,730 miles by air, 14,460 by automobile, and 11,110 by train. Good editor that he is, he wears out the soles of his shoes, not the seat of his pants.

Rated the dean of Pacific Coast editors, Havie has had 25 years of experience in the food industry. He has long been one of FE's top editors.

A practical food engineer, Havie got his basic education in food plant operation as a factory superintendent. And in his 14 years of digging into developments as an FE editor, he has assimilated an exceptionally broad and thorough knowledge of the field and its technology.

Watch for his report on the pushbutton valve in a coming issue. It will be part of an article describing many engineering advances in a new Carnation plant.

Meantime, you will be interested in his article, "New Cannery in 100 Days," on page 112.

What's a chemist got to do with tank cars?

Liquid level—vapor action—types of linings—temperature factors—the presence of impurities . . . these are a few of the considerations which the chemist must evaluate. It's the chemist's job to see that bulk liquids are shipped in the cars equipped to carry his products. The knowledge gained from years of hauling liquids in bulk enables General American to meet the chemist's exacting requirements—to assure that corrosion of the cars will be minimized and product contamination prevented.

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TRENDS & FORECASTS

Special

FOOD ENGINEERING

Service to Executives

An all-time peak for the gross national product rate, $425 billion, was being chalked up by the U.S. economy at the beginning of February. And the figure for the year is expected by Secretary of Commerce Weeks to exceed last year's $412 billion. "That spells continuing prosperity."

Cost of labor hit $2 an hour last year. AFL-CIO is aiming at $3 in 10 years, with a legal minimum of $1.50 to $1.75. Average hourly earnings in food marketing, including processing, have increased to $1.81.

Transportation costs have risen to 8¢ of the retail food dollar, compared to 5.5¢ 10 years ago. The several general rate increases granted to the railroads are a principal factor.

Food sales in retail stores increased about $2½ billion in 1956 to a record $45.95 billion. Total food sales are estimated at $71 billion, of which $50 billion is for processed foods.

City families are spending an average of $32 a week for food, up 25½% in seven years. Half of the budget went for meats, poultry, fish, eggs, and milk products. About $5 was spent for fruits and vegetables.

Meat production hit a record 28 billion pounds last year, climaxing five continuous years of increases totaling 28%. Aside from some decline in pork for the first half of the year, the outlook for 1957 is good.

America's sweet tooth made 1956 the best year on record for candy. A production increase of 8% for the first 10 months pointed to a year's output of 2.9 billion pounds—about 1 lb. more per person. With emphasis on quality and better packaging, the upward trend is expected to continue.

Food Surplus Trimmed

Important headway in trimming its huge stocks of surplus farm products this year is anticipated by the government. Surplus disposals, says Secretary Benson, totaled $2.7 billion in fiscal year 1956–five times the 1953 level.

In the current fiscal year, which runs out June 30, USDA hopes get rid of a whopping $4 billion worth.

Benson is confident that the huge surpluses of corn (900 million bushels) and wheat (775 million bushels) can be reduced. USDA currently is buying each week about 2.5 to 3 million pounds of butter, 3.5 million pounds of cheese and 4 to 5 million pounds of non-fat dried milk. But it has ready outlets for these quantities in sales, and in donation programs such as the school lunch "giveaways."

Stocks of butter and dried milk are quite small. Only the cheese inventory (160 million lb.) might be troublesome. USDA believes it can hold this inventory at present levels, through 1957.

There are no government stocks of edible oils.

Food Exports Soaring

This country is well on the way toward setting a new record in exports of foods and other farm products. The Department of Agriculture estimates that exports soared to $2.3 billion in the June to December, 1956, period.

Barring an unexpected slump, shipments abroad will come close to $4.5 billion by the end of the current fiscal year, June 30, 1957. The previous annual record was the $4 billion exported in 1952. All major

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classes of food products are sharing in today's booming exports.

Contributing to the exceptional volume is the high level of economic activity abroad and the curtailment of imports by Europe from its traditional supply sources east of Suez. With the Suez Canal route reopened to shipping, Europe is expected to turn back to its Far Eastern suppliers and cut down on U.S. buying.

Exports under the government's agricultural surplus disposal program —in which U.S. farm products are sold for local currency of foreign countries—have mounted sharply and now account for about 12% of all U.S. farm exports.

Accounting for the lion's share of agricultural foreign aid shipments, this program (Title I to Public Law 480) has been the vehicle for $2.9 billion of U.S. farm products exports since its start on Jan. 1, 1955. The total includes $476 million of non-food products (tobacco, cotton).

Orange Concentrate Stumbles

With a 4% slip to 53.6 million gallons last year, frozen orange juice concentrate came to the end of its skyrocketing popularity curve—at least temporarily.

The curve started leveling off three years earlier, with a 13% gain in '55, 11% in '54, and 17% in '52. This came after precipitous gains of 43% in '51, topped by 54% in '52.

High prices, traced to cost of the fruit on the tree, are blamed for the slump. Charts show that consumer enthusiasm for the product has always been dampened by price increases.

It is conceded, too, that quality was not quite as good on the average. Too much fruit was picked too soon, partly to meet processors' demands, and to some extent because cold weather caused fruit to color prematurely. Some argue that heat-treating of the juice is slightly damaging to flavor. But processors point out that this makes the juice stand distribution-temperature abuse better, and reach consumers with higher quality.

Competition from chilled juice is not considered a major factor. Only 3.5% of the families bought this product last year, compared to 30% for the concentrate.

The 1957 outlook for the concentrate is clouded. Price of fruit on the tree is said to be 25 to 50¢ a box too high. However, the per-box advertising tax has been boosted from 3 to 5¢ to move a Florida crop that is doubling every ten years. With fruit pro-

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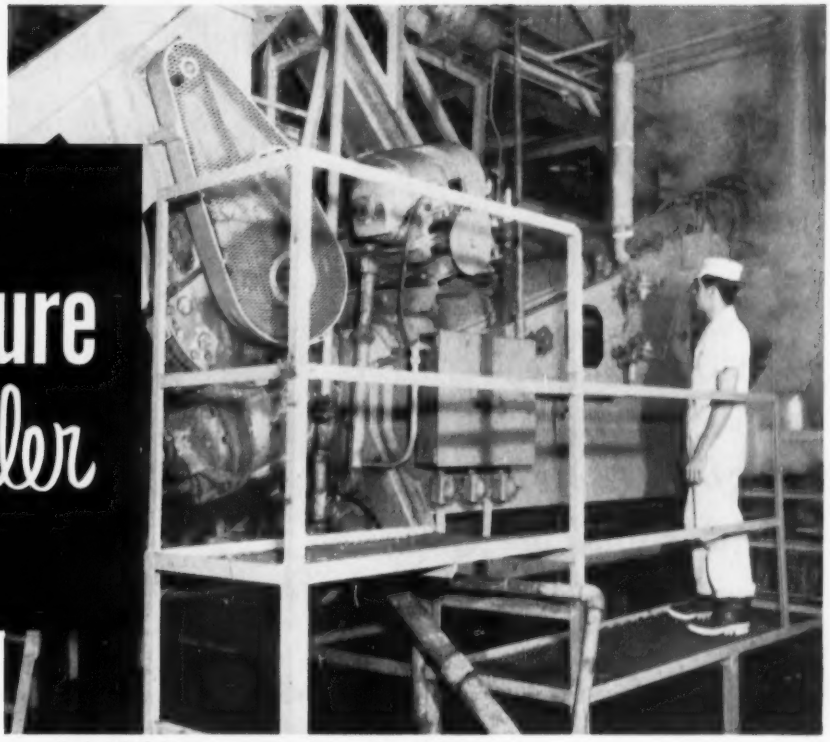
Hi-Pressure *steam peeler*



Typical FMC Steamer preparing fruits and vegetables for *Gerber's Baby Foods* at their Oakland, California plant.

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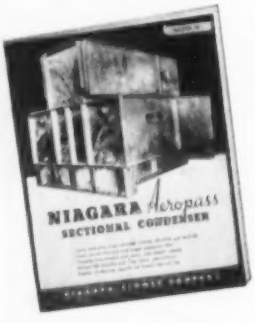

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duction now increasing faster than demand, lower prices are likely in the years ahead.

Canned Hamburgers Spurt

Paced by hamburger, canned beef products skyrocketed last year with a 184% increase in production, output being 93 million pounds.

But franks and wieners declined a surprising 46%.

Canned meats of all types increased 15%, continuing a long trend to greater popularity as convenience items. Output totaled 1,666 million pounds.

There was an 18% increase for canned meats weighing over 3 lb., and 14% for those under that weight. Luncheon meats gained 19%, canned hams 16%, deviled ham 15%.

Other increases were 14% for meat balls and spaghetti, and 15% for meat stew. On the down side were sliced dried beef, off 15%, tongue (not pickled), 9%.

Contributing to the overall increased demand for the canned products were use of higher quality meats, more care in packing, and a greater variety.

More convenience canned-meat items are coming, and the outlook is brightened by increased promotion.

Tuna Tops Old Record

Ten million cases of tuna were sold in the U. S. last year, according to Charles R. Carry, executive director of the California Fish Canners Assn. Most of the tuna came from Southern California canners and tuna clippers.

Previous all-time high was 8,300,000 cases, sold in 1953.

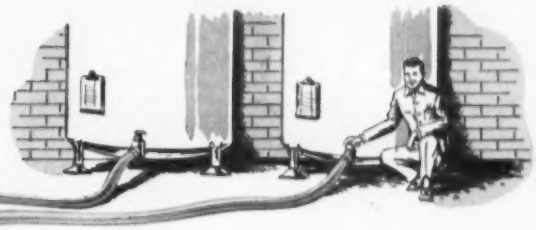
Prune Predicament

It's not too surprising that prunes are in serious over-supply. For years this product has been considered as "boarding-house fodder," and little has been done about it, according to Robert McArthur, marketing specialist.

With the consumer trend running to ready-to-serve foods, the bulk of the prune crop is being packed and marketed in the same form as it has been for the last 20 years. Not enough research is aimed at ready-to-serve prunes.

More emphasis on canned stewed prunes might solve the over-supply situation.

USDA has been asked to purchase



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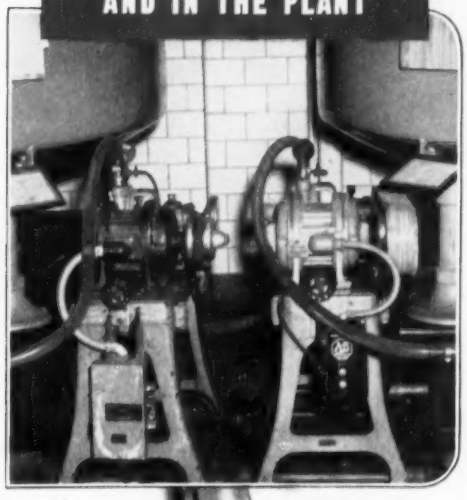

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Fifty-five bore sizes (1/16" to 2" I.D.) accommodate virtually every plant or laboratory requirement. Simple clamp fittings make for fast, easy coupling and special types of Tygon are available for special service such as vacuum or pressure work.

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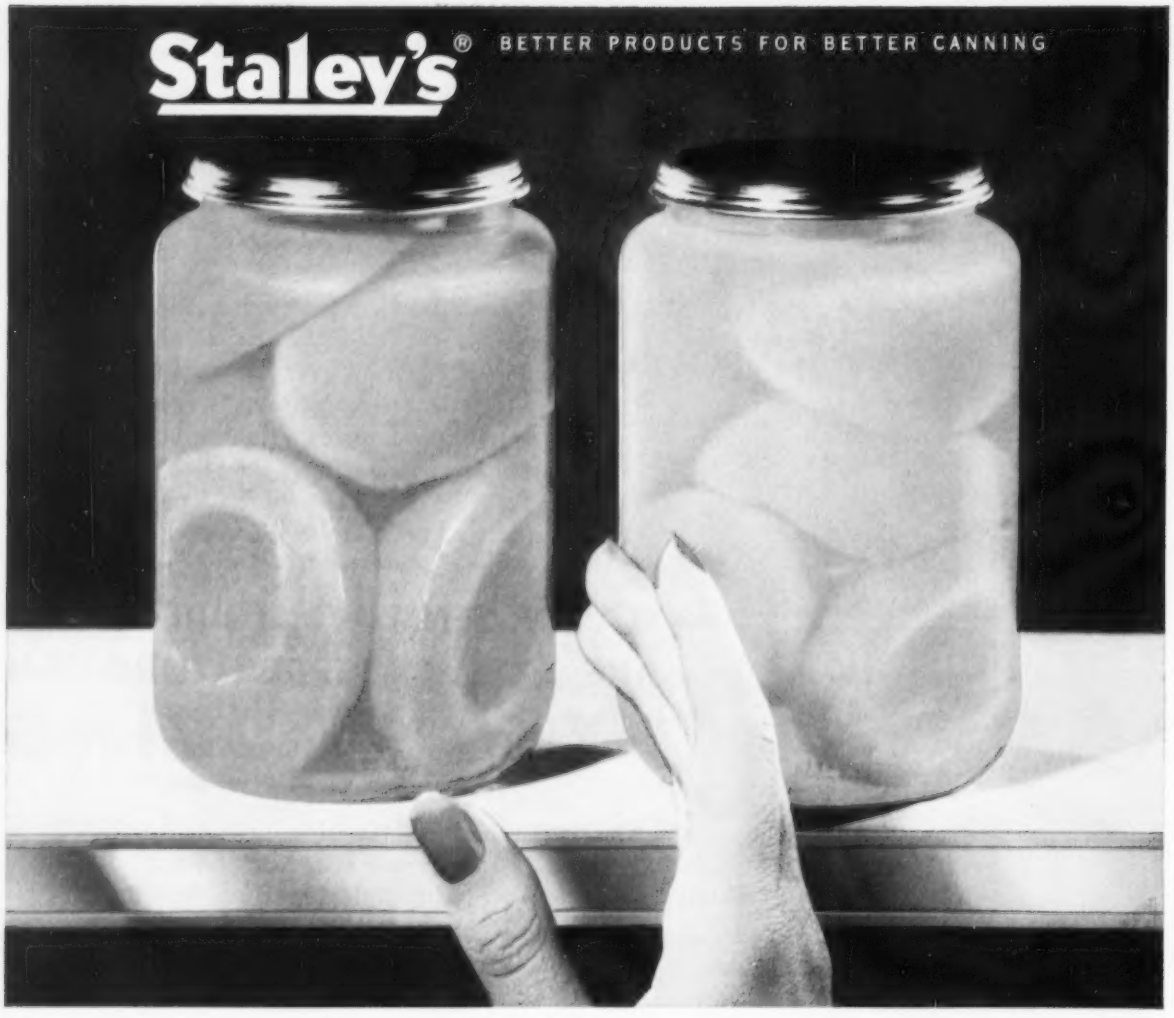

How does your brand stack up with Mrs. Shopper in natural fruit flavor, firmness, color?

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some 5-10,000 tons for school lunch programs. And it is suggested that USDA initiate a diversion program permitting small prunes to be used for animal feed.

One bright factor is the increasing consumer acceptance for canned prune juice.

HORS D'OEUVRES

▶ Lever Bros. has developed striped toothpaste. The trick is a dispenser in the end of the tube which exudes five strips of red color onto the paste as it is squeezed from the tube. Just the thing for decorating cakes.

▶ University of California ichthyologists find that rambunctious albacore can be quieted for safe transport in water tanks by sedation with alcohol. This piscatorial potting procedure ought to get the fish there well preserved, either alive or dead.

▶ California food growers spend $9 million annually for chemical weed killers. Takes good land, Sir, to grow weeds so profusely.

▶ Per capita consumption of candy is increasing because the quality has been improving. Make it good enough, and those calorie counters lose count.

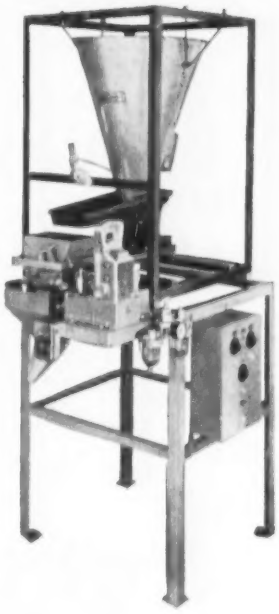
▶ While you feed the soul with music at home, you're likely to feed the face with food. So a Hi-Fi record catalog contains a "Handy Diet Guide," with calories precounted. The idea is to eat like a tweeter, not a woofer.

▶ We hear, too, that Cornish-Rock broilers develop faster when soothed with sweet music daily. So there's no kidding about that Hi-Fi pickup.

▶ Employees of Hammond Standish & Co. are loaning the hard-pressed 99-year old Detroit packing firm 10% of their wages for the next five years. That's taking an interest in the work!

PROTECT YOUR PROFIT MARGIN

SAVE PRODUCTION COSTS ... ELIMINATE OVERWEIGHTS



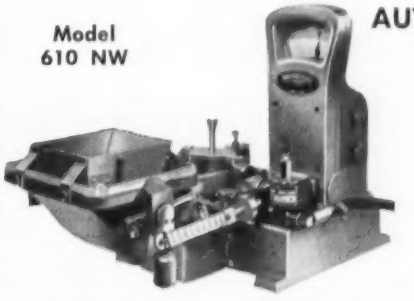
EXACT WEIGHT Weighing Machines offer you these important features:

- Precision industrial type scale.
- Over-Under indicator for visual check to eliminate need for separate checkweighing operation.
- Calibrated adjustments with counterweights of known value, graduated beam; poise and scale indicator.
- Design backed by 40 years experience in specialized weighing.
- Readily accessible service and maintenance facilities.
- Performance guaranteed in writing.

This EXACT WEIGHT Automatic Net Weighing Machine is especially adapted for weighing many types of products in the food industry. Its fast and accurate operation speeds production, cuts production costs. Providing a constant and visible check on every package weight, it eliminates overweights, protects your profit margin. Ruggedly built and backed by 40 years experience in specialized weighing, EXACT WEIGHT Weighing Machines give you trouble-free service with maintenance costs at a minimum.

Model 620 NW has a rated capacity of 10 lbs.—Model 610 NW has a 3 lb. capacity. Write for Form #3311 for further specifications.

Model 610 NW



AUTOMATIC NET WEIGHER

The Net Weigher, left, can be supplied without the feeder machine, support frame and discharge chute. It can be easily installed on any machine that requires accurately controlled weight as part of its operation. Write for complete details.

VISIT US IN BOOTHS 626 - 628 AT THE NATIONAL PACKAGING EXPOSITION, APRIL 8-11

There is no substitute for Exact Weight

Exact Weight Scales

Better quality control

Better cost control

THE EXACT WEIGHT SCALE COMPANY

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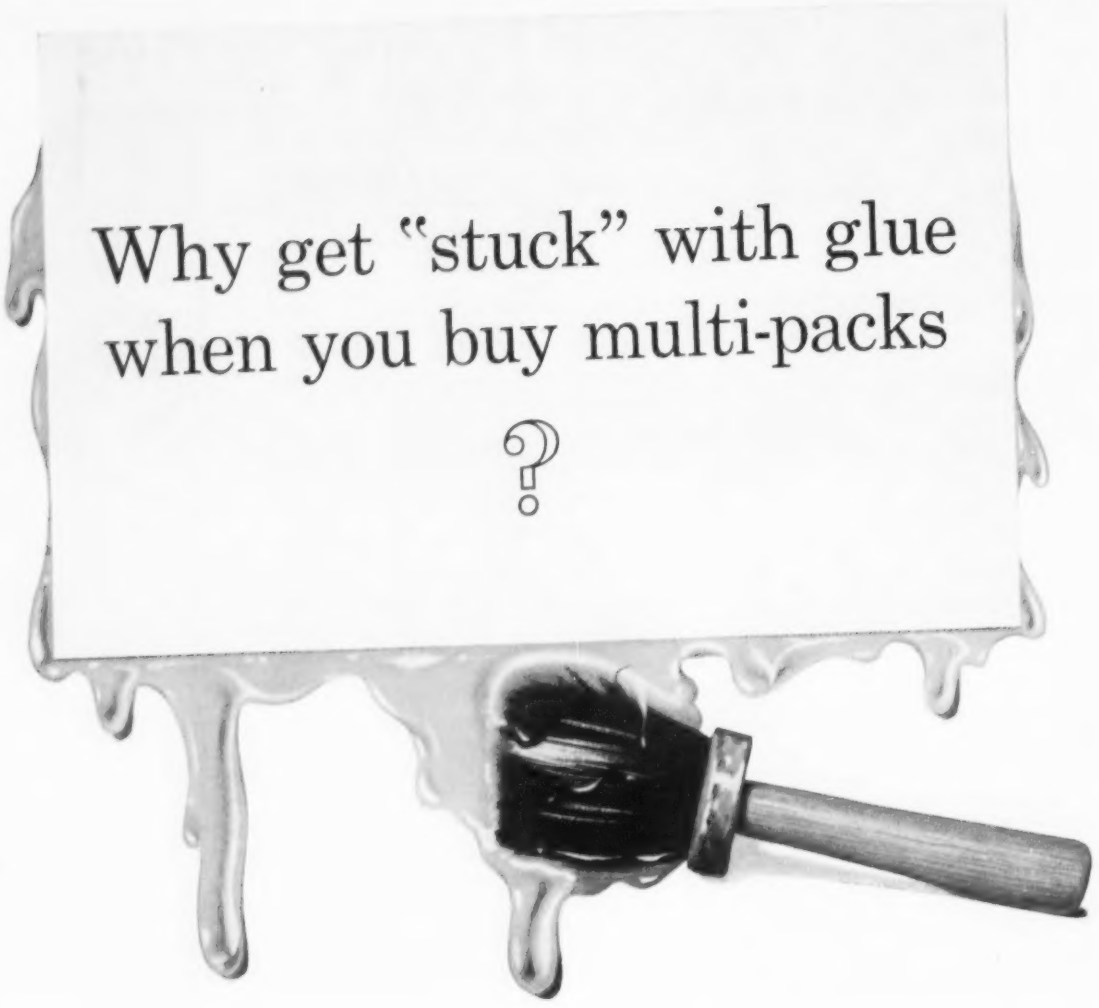
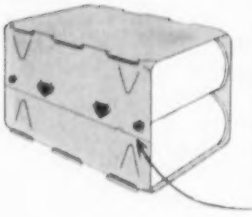


Save with *CLUSTER-PAK*®. . . the self-locking carton that needs no glue to be world's strongest!



Of course you can glue Cluster-Pak cartons if you *want* to. In fact, when we invented Cluster-Pak, we provided for glue pots on our machines. Yet! Over 700 million cans have been packaged in Cluster-Pak since then. And *not a single customer has ever used a single drop of glue!* The reason? Cluster-Pak offers the unequaled strength of famous Mead quality kraft combined with the world's only self-locking construction that *requires no glue.* So why pay for glue you neither want nor need? Instead, put your money in *quality* . . . and protect your products in Cluster-Pak. It's the strongest multi-pack carton ever made!

CLUSTER-PAK IS ANOTHER CREATIVE IDEA FROM

Atlanta Paper Company

Where Packaging is Advertising

ATLANTA PAPER COMPANY, ATLANTA 2, GA.

DEVELOPMENTS TO WATCH

Special

FOOD ENGINEERING

Service to Executives

Irradiation will be preceded by enzyme inactivation, and followed by aseptic canning, in process being developed by HMV Corp. Purpose is to eliminate quality changes encountered in sterilization by radiation alone.

Addition of enzymes to restore flavor lost in dehydrating foods continues to receive attention. This idea came up again at National Research Council meeting in Chicago. It has been tested for cabbage.

Hushed-up progress in ST-HT food processing by direct steam injection is under way. Watch for more news of successful applications that pay big benefit dividends.

Nitrogen-atmosphere storage of fruits and vegetables, with little or no refrigeration, has been put into commercial use in Europe. And a special low-cost gas is employed to ripen fruits quickly.

Meals in collapsible metal tubes for in-flight and emergency feeding have been developed by National Research & Development Corp., Atlanta. Product contains balanced nutrients in bulk-providing cellulose gum.

Foil-lined multiwall paper bags which take the place of fiber drums are announced by Hudson Pulp & Paper Corp. Bags are relatively inexpensive, greatly reduce shipping weight, and save drum-storage space.

Machine vending of sizzling hot franks in buns, individually cartoned with an envelope containing mustard and spreader, is achieved with the Vend-a-Frank unit of U.S. Vending Machine Corp.

In development stage is a new revolutionary frozen food cabinet which utilizes curtains of jetted-air as both product refrigerant and protective insulation. A prototype will be built soon.

It has been discovered that malt flour contains a natural antioxidant, together with some other preservative agent. Neither has been chemically identified.

Whether fats cause atherosclerosis will continue to be a hot controversial subject, and processors of fatty foods should be on guard, ready with some answers. Public could become concerned.

Better meat is on the way. USDA announces that tenderness can be bred into meat animals. Progress is being made in meeting growing consumer demand for lean pork. And packers are talking about steers with more red meat.

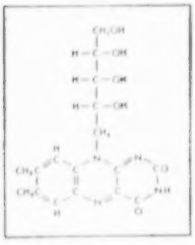
De-listing of four yellow coal-tar food dyes has been launched by FDA. A proposed order banning yellows 1, 2, 3, and 4, was issued Jan. 24, after animal tests indicated excessive amounts could cause injury.

The Vital Story

A Quick History. Independent investigators, working separately to unlock several of nature's doors, sometimes open up unsuspected relationships. This happened with vitamin B_2.

Investigations. About 25 years ago, several groups, notably Warburg's, were investigating a "yellow enzyme" obtained from yeast. Almost simultaneously other investigators were studying a food factor that aided growth of laboratory animals.

What they found. Proceeding with chemical analysis of this growth factor, the team of Kuhn, György, and Wagner-Jauregg noted a relationship between the growth-producing agent and the "yellow enzyme." Their findings, and those of other researchers along similar lines, were published in 1933. Eventually, riboflavin and an essential part of the yellow enzyme were found to be identical and the unity of an essential nutrient and cellular metabolism was established.



Isolation of pure riboflavin was achieved by Kuhn and his co-workers, and by Ellinger and Koschara, in 1933.

Nomenclature. Known in the United States as riboflavin, this vitamin has also been called lactoflavin, ovoflavin, hepatoflavin, and vitamin G.

SYNTHESIS

By 1935, two eminent chemists, working separately, had synthesized riboflavin, practically in a dead heat. Prof. Paul Karrer of the University of Zurich, a collaborator of the Hoffmann-La Roche Laboratories, produced the first successful synthesis. Five weeks later Richard Kuhn of Germany announced his synthesis of the vitamin. Prof. Karrer subsequently shared the Nobel Prize in Chemistry for his work in vitamins and carotenoids.

The Karrer synthesis forms the basis for chemical processes in widespread use today by Hoffmann-La Roche and other leading manufacturers throughout the world. Riboflavin is also manufactured today by fermentation methods.

CHEMICAL AND PHYSICAL PROPERTIES

Riboflavin is yellow, slightly water-soluble with a greenish fluorescence and a bitter taste. Its empirical formula is $C_{17}H_{20}N_4O_6$. Vitamin B_2 produced by the Roche process is identical in every way with that occurring in nature.

How does vitamin B_2 work? Riboflavin is a vital part of nature's chain of reactions for utilization of carbohydrate energy. It has been found to be a constituent of many enzyme systems and is thus intimately connected with life processes. It is probably required by the metabolic processes of every animal and bird as well as by many fishes, insects and lower forms of life. (In certain animals, however, the requirement may be synthesized by bacteria within the intestine.)

In the cells riboflavin goes to work attached to a phosphate group. This substance, known as riboflavin-5′-phosphate or flavin mononucleotide, may in turn be attached to still another essential substance, adenylic acid, forming flavin adenine dinucleotide. Either nucleotide then is attached to protein, thereby forming an enzyme, and takes its part in oxidation-reduction reactions.

Requirements in Human Nutrition. As we have seen, vitamin B_2 is essential to life. We have no special storage organs in our bodies for this vitamin, although a certain level is maintained in various tissues, with relatively large amounts found in the liver and kidneys.

MEASURING METHODS

In the beginning, riboflavin activity was described in "Bourquin-Sherman units" and requirements were thought to be very small. Subsequent research showed otherwise. Milligrams of weight became the unit and the Food & Drug Administration of the U. S. Dept. of Health, Education & Welfare has established a minimum daily requirement of 2.0 mg. of riboflavin for all persons 12 or more years old. For infants it is 0.5 mg. These requirements are designed to prevent the occurrence of symptoms of riboflavin deficiency disease. The minimum daily requirement for this vitamin for children from 1 to 12 years has not been established by the F. & D. A.

Recommended allowances. The Food & Nutrition Board of the National Research Council has recommended the following daily dietary allowances of riboflavin, expressed as milligrams. These are designed to maintain good nutrition of healthy persons in the U. S. A.

Men		1.6	
Women		1.4	
"	(3rd trimester of pregnancy)	2.0	
"	(Lactating)	2.5	
Infants, 1-3 months		0.4	
" 4-9 "		0.7	
" 10-12 "		0.9	
Children, 1-3 years		1.0	
" 4-6 "		1.2	
" 7-9 "		1.5	
		Boys	Girls
Adolescents, 10-12 years		1.8	1.8
" 13-15 "		2.1	2.0
" 16-20 "		2.5	1.9

# of VITAMIN B_2

(Riboflavin)

by Science Writer

Deficiencies of vitamin B_2 appear in several ways in human beings. The eyes, the skin, the nerves, and the blood show the effects of too little riboflavin. Laboratory animals have demonstrated that a riboflavin-deficient diet can cause death of adults and can slow or stop growth in the young. Female animals, deprived of riboflavin in the diet, may produce offspring with congenital malformations.

Medical uses. To overcome and control deficiencies in human beings, physicians have pure riboflavin available for administration by injection or orally, by itself or with other "B" vitamins or multi-vitamin-mineral combinations.

How do we get our daily riboflavin? Vitamin B_2 has wide distribution throughout the entire animal and vegetable kingdoms. Good sources are milk and its products, eggs, meats, legumes, green leaves and buds. Whole-grain cereals have significant but not large amounts of riboflavin.

ADDITION TO FOODS

Cereal foods play a large part in our diet. To produce the white flour almost all of us want, millers are obliged to remove parts of the wheat that contain much of the grain's riboflavin and other nutrients. In addition, cereal grains are not rich sources of riboflavin. Millers meet this problem by *enriching* the grain foods for which federal standards exist with vitamins B_1, B_2, niacin and the mineral iron. In the case of vitamin B_2, however, they do more than *restore* the processed food to its natural riboflavin level; they *fortify* the food with enough of this essential vitamin to make it nutritionally more valuable than it was in nature.

Acting to protect the good health of millions of Americans, bakers and millers adopted *enrichment* of white bread and white flour in 1941. Since that time, other foods, such as macaroni products, corn meal and grits, farina, pastina and breakfast cereals have had their food value increased by enrichment with pure riboflavin and other vitamins and minerals.

When enriching, fortifying or restoring, food manufacturers add the necessary quantity of riboflavin (and other vitamins and minerals) to the food during processing, so that the finished product meets federal, state, and territorial requirements or contributes to the consumer an amount of the vitamin that dietary experts believe significantly useful.

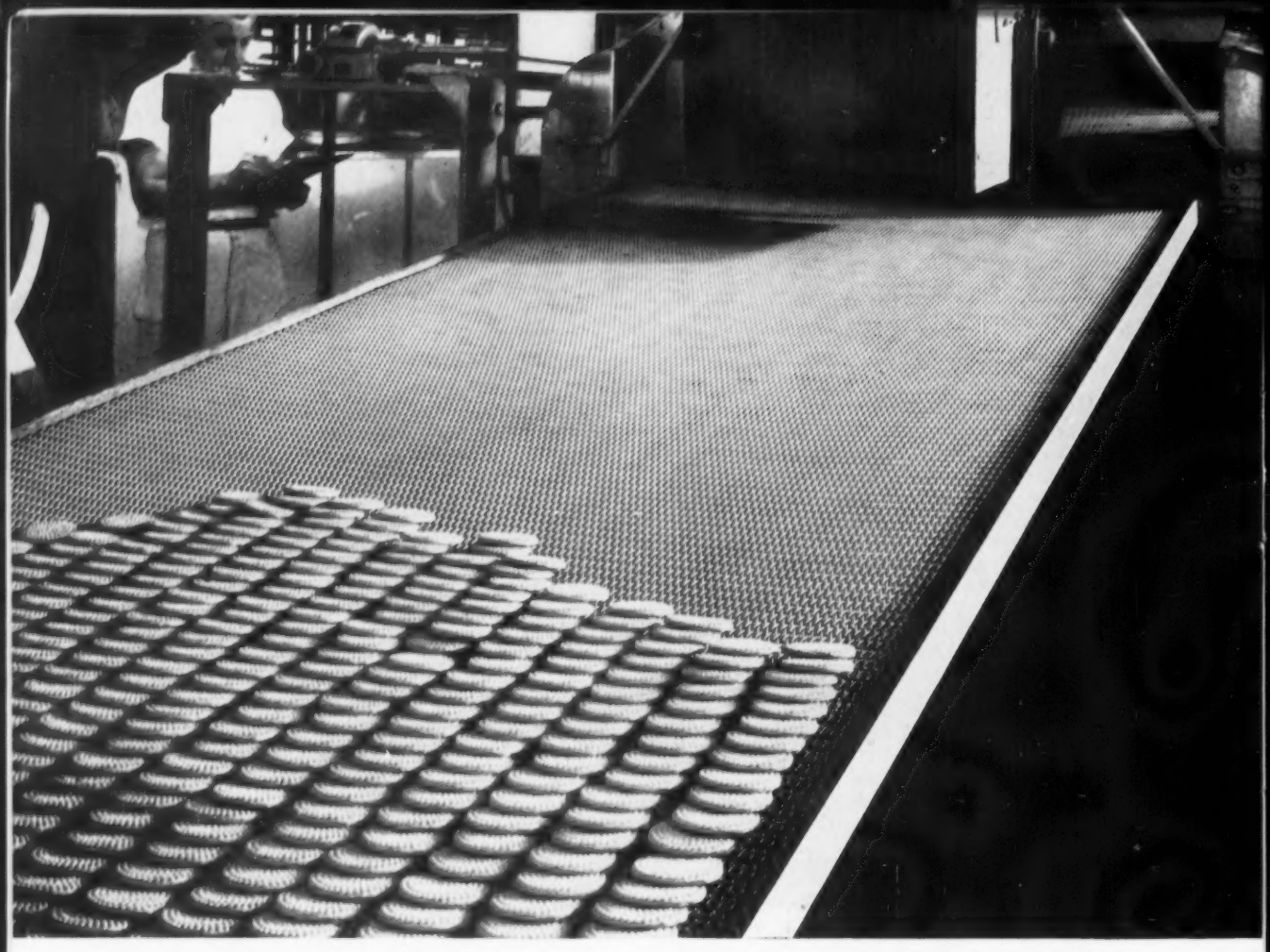
PRODUCTION

Prof. Karrer's synthesis of riboflavin was a laboratory success. Adapting the process to commercial production, however, demanded original thinking by chemists at Hoffmann-La Roche. The production of riboflavin by chemical synthesis requires the production of ribose, a rare sugar, at an early stage in the process. This special sugar must be made inexpensively if the synthesis is to be practical. Sugar chemistry is a difficult matter. In a brilliant piece of work, the Roche chemical experts developed a method to produce ribose on a commercial scale by an electrolytic process, thus overcoming a most troublesome problem. Subsequently, Roche chemists developed the first practical synthesis for riboflavin-5′-phosphate, identical with natural flavin mononucleotide.

Picture three streams joining to form a river and you have a simplified idea of the Roche process for synthesizing vitamin B_2. O-xylene and glucose are processed separately to form xylidine and ribose respectively. These are joined to form ribitylxylidine, which is then converted to ribitylaminoxylidine. Starting separately with malonic ester, which is processed through intermediate stages to alloxan, the third "stream" is then joined with ribitylaminoxylidine to form riboflavin. Purification occurs at each step of the synthesis. Riboflavin 'Roche' equals or exceeds U. S. P. standards.

By the tons. So efficient is the Roche process that pure riboflavin is produced *by the tons* for use in pharmaceutical products and processed foods. An interesting development by Roche is the production of riboflavin in different forms related to the method of end use. 'Roche' Regular riboflavin U. S. P. is especially useful in dry enrichment premixes, powdered dietary supplements, pharmaceutical tablets and soft gelatin capsules. 'Roche' Solutions type is preferred for the manufacture of solutions having low concentration. 'Roche' Riboflavin-5′-Phosphate Sodium is a highly and rapidly soluble riboflavin compound favored for all pharmaceutical liquid products and some tablets, lozenges, and capsules. It has a more pleasant taste than the bitter U. S. P. riboflavin.

This article is published in the interests of pharmaceutical manufacturers, and of food processors who make their good foods better using pure riboflavin 'Roche.' Reprints of this and others in the series will be supplied on request without charge. Also available without cost is a brochure describing the enrichment or fortification of cereal grain products with essential vitamins and minerals. These articles and the brochure have been found most helpful as sources of accurate information in brief form. Teachers especially find them useful in education. Regardless of your occupation, feel free to write for them. Vitamin Division, Hoffmann-La Roche Inc., Nutley 10, New Jersey. In Canada: Hoffmann-La Roche Ltd., 286 St. Paul St., West; Montreal, Que.



Millions of Megowen Educator cookies and crackers are cooled every day on Wissco Belts. The open mesh design assures rapid cooling because it exposes the top, bottom and sides of each item to cool air, thus greatly retarding inner package deterioration.

FAMOUS NAMES
ride on WISSCO BELTS
Megowen Educator Food Company • Lowell, Mass.

The story of Wissco Belts is best told by their users. For example, one of the nation's leading bakers, Megowen Educator Foods, reports:

"Our six Wissco stainless steel spiral belts have enabled us to double the shelf-life of our products by assuring rapid, complete cooling before packaging."

According to Mr. W. E. Megowen, Vice President in Charge of Production, "This doubled shelf-life has enabled Megowen Educator Foods to eliminate costly merchandising operations including frequent service calls on dealers and a high percentage of returned goods.

"An additional advantage—extremely important in the consumer-sensitive food market—is that the efficient Wissco Belt cooling operation has greatly reduced the possibility of poor quality merchandise reaching the customer.

"Since we started using them in 1938," concludes Mr. Megowen, "our Wissco Belts have helped us maintain an uninterrupted production flow. For temperature resistance, durability and ease of maintenance, we consider Wissco the best available belt."

Chances are that Wissco Belts can help you solve your processing and conveying problems, too. Get the complete story without obligation... just contact your nearby CF&I sales office.

WISSCO BELTS
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

CF&I

THE COLORADO FUEL AND IRON CORPORATION - Denver and Oakland
WICKWIRE SPENCER STEEL DIVISION - Atlanta - Boston - Buffalo - Chicago - Detroit
New Orleans - New York - Philadelphia - CF&I OFFICES IN CANADA: Toronto - Montreal

4537

CREATING THE PACKAGE

EVOLUTION of company's cocoa pack for vending machines started with loose fill (left) and progressed through cellophane-wrapped tray, containing a folded envelope, to a gusseted pouch and stirring stick enclosed in a tray overwrapped with pouch stock. Final package (right) has printed overwrap instead of labels.

Pouch & Tray—Top Coin-Machine Food Pack

AT FIRST SIGHT, the vending machine market—fast growing outlet for an ever-increasing range of products—might seem to impose severe limitations on package design.

For, carton dimensions and costs are rigidly restricted by the mechanics and economics of the "dime-operated salesmen."

But creative imagination can burst even these strictures. A case in point is the recent success of Nestle Co., Inc., White Plains, N. Y., in entering this field with a five-product line of "instant" foods—cocoa, soluble coffee with sugar and powdered cream, chicken and beef bouillons with crackers, and cheese and crackers.

To fit these goods into a package that measures a scant 4¼x2⅛x⅝ in. took some real creative packaging, plus engineering assistance from two New Jersey contract packagers and machine makers: Scandia Mfg. Co., North Arlington, and Mason-Keller Corp., Roseland.

Scandia, which is primarily a machine manufacturing company but offers contract packaging as a test-market service, was tapped to design the outer wrap.

Tray-And-Overwrap Pack

The cost margin was incredibly small, but it was finally agreed that an overwrapped tray pack offered the best appearance—for what was hoped would be a practical price.

After surveying lock and glue-type trays already available, Scandia engineers discovered that they could buy roll-stock paperboard (Nead Board Sales, Cincinnati) for about 60% less than the pre-cut tray blanks.

With tray material in hand, the engineers designed and built a machine that die-cuts precisely dimensioned tray blanks from 20-point patent-coated newsprint, and cut-scores them for folding at over 100 units per minute.

Unlike similar trays on the market, the end tabs on this one have no cut-back or trim. The bevel is unnecessary, because in this particular application tray sides are kept perfectly perpendicular.

Blanks are deposited automatically in a forming and filling machine, developed simultaneously by the company. Here, they are fed from a stack into a pocketed conveyor. A plunger accurately forms the trays right in the pockets. No glue is used. Trays are held in shape by the pockets until they are filled and delivered to the overwrapper.

At first, Nestle and Scandia thought they could fill the cocoa loose into the trays (see lead photo). But fat and volatile flavors in the product were hard to

FOLDING ENVELOPE containing three pouch sections is an unusual solution to the problem of enclosing three powders—coffee, cream, and sugar—in the same package. Bouillon pack is covered with cellophane.

PALMER
MERCURY ACTUATED

DIAL THERMOMETERS

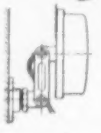
in 3 types to suit any requirements

PATENTED

Full 4½" dial face. Stem can be placed at any angle and case can be rotated to any readable position.

1 **Rigid Stem Dial Thermometer** tapered bulb, interchangeable with standard industrial thermometer separable socket. (As illustrated above.)

2 **Wall Mounted Dial Thermometer** with flexible connecting armor. Case adjustable to easy reading position.



3 **Flush Mounted Dial Thermometer** for panel mounting with flexible connecting armor.

All three types have a full 4½" dial face.

for accuracy: Mercury actuated . . . Fully Compensated by Invar Compensaton. Guaranteed Accurate 1 scale division.

for angularity: Can be adjusted to most readable position at any angle desired.

for readability: Bold Black Numbers . . . 11" of scale Reading Dial face can always be placed in easiest readable position.

for interchangeability: Always specify "PALMER" Separable sockets as they are interchangeable for Dial or Industrial type Thermometers.

Write for Catalog information

PALMER
THERMOMETERS, INC.
Norwood Ave., Cincinnati 12, Ohio
Mfrs. of Industrial Laboratory Recording and Dial Thermometers

contain. And sifting of the fine powder was also a deterrent.

Next, Nestle supplied its standard, 1-oz. pillow pouch, measuring 3½x4⅞ in. This package had to be folded in half to fit the tray—a very difficult operation. Final solution was a Transwrap-type pouch with gussets. These "pleats" enabled the proper volume of product to be put in the pouch, utilizing entire tray space. (Contract packager: Dumont Enterprises, Englewood, N. J.).

This product bag is constructed from Saran-coated No. 300 cellophane, a strong barrier against moisture entrance and flavor loss.

Overwrap for the tray consists of 25-30 pouch-stock with an MS coating—a heat-sealable 25-lb. paper with 5-lb. wax coating (Riegel Paper Co., New York City). Single-color printing (red) gives product and company identification and directions for use. Overwrapping unit is a standard Scandia machine.

Cellophane is used to overwrap three of the other products—the two bouillons and the cheese and crackers—where identification is printed on the inside pouch. Here, the moisture barrier illustrates an interesting balance between cost and protection. In the cheese pack, the moisture is present right inside the tray, and stems from the foil-wrapped cheese.

To keep the crackers crisp and dry, they are overwrapped in Saran-coated No. 300 cellophane. Then, lower-cost, plain cellophane (same No. 300) is used for the tray overwrap.

In the bouillon packages, however, the moisture threat comes from outside the tray. Therefore, the crackers are covered with only 300 cellophane, while the tray wrap consists of heavier, No. 450 cellophane.

Three Dimensional Pouches

The bouillon and coffee powders are contained in foil. To package these products, Nestle turned to Mason-Keller Corp.

Specializing in contract packaging, this company has developed a technique and machine for forming three-dimensional pouches.

To package the combination of instant coffee, sugar, and powdered cream, M-K engineers devised an ingenious folding envelope.

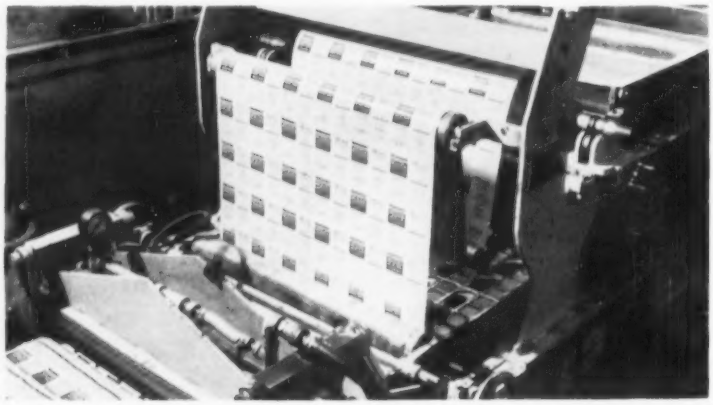
Bottom of this container is .002-in., vinyl-coated aluminum foil, containing three, die-formed pockets.

Top of the pouch is a flat, multi-laminate (Continental Can Co.) that starts with .0008-in. vinyl-coated aluminum foil on the inside. This is bonded with a pressure-sensitive adhesive to 29-lb. paper which, in turn, is glued to .00035-in. foil. The latter is gravure printed in four colors (buff, brown, red, and yellow). Printing is covered with nitrocellulose.

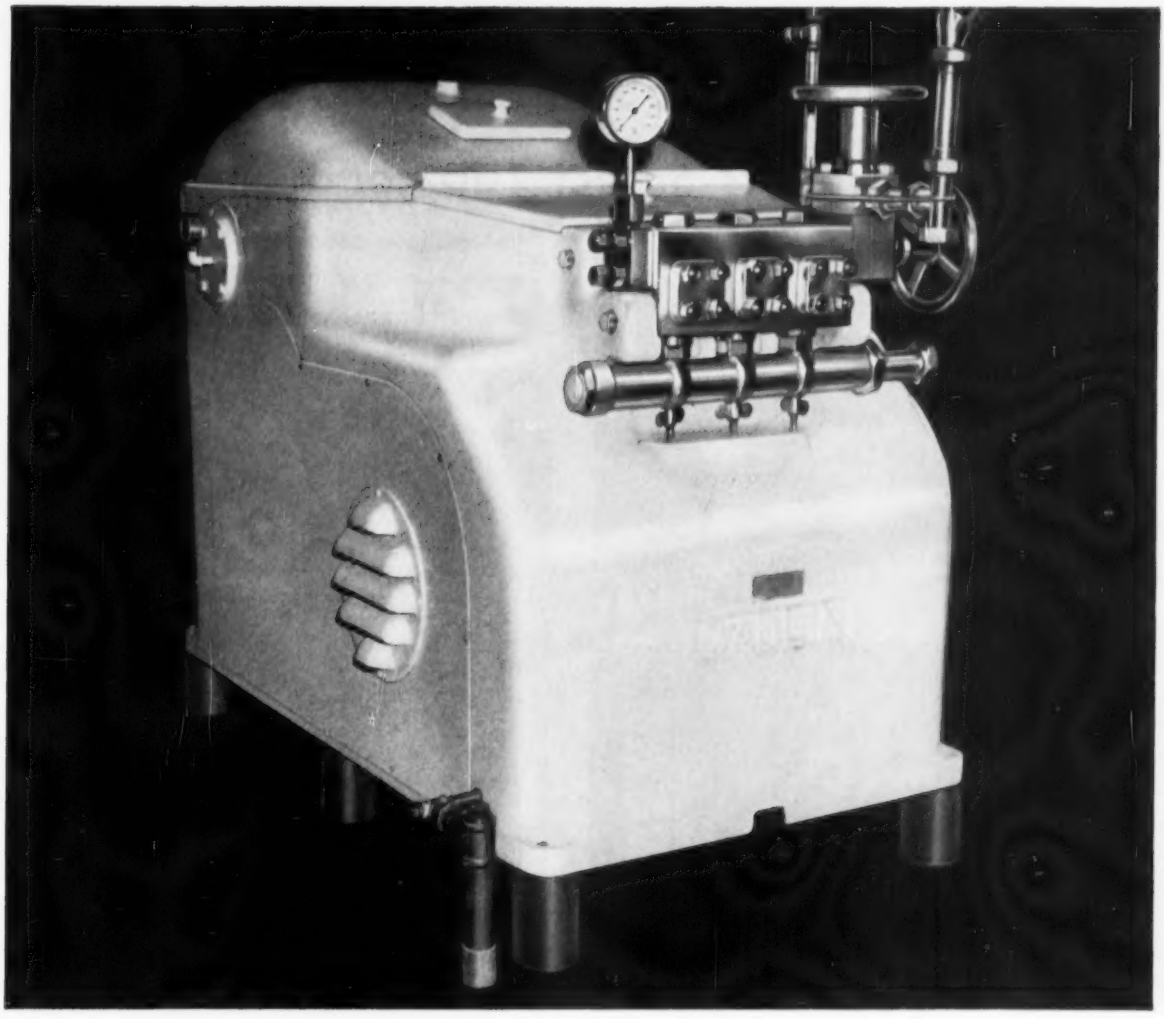
Vinyl-coating on the two foil surfaces is, of course, for heat sealing. The .002 bottom foil has been found best for die forming.

It is desirable that the top foil laminate be perfectly flat, so that the double envelope can be folded. This is insured by the stiff paper core. The .0008-foil inner layer gives top protection from moisture invasion. The outer, .00035 foil is an ideal printing surface.

The thin, nitrocellulose overcoat not only guards the print from scuffing, but adds "slip" properties.



POUCH PACKAGER pulls bottom foil from roll. Male dies draw pockets against a flexible surface. Three hoppers (top right) add coffee, cream, and sugar powders volumetrically through flat, reciprocating valves. Top laminate (center) is applied by heat sealer (lower left). Slitters and perforators separate package, form hinges at the rate of about 200 packages per minute.



Syrup for a well known soft drink is pumped through this homogenizer at the rate of 1500 gallons per hour. Stainless is used wherever the product touches metal. Manufacturer: Manton-Gaulin Mfg. Co., Inc., Everett, Mass.

STAINLESS isn't only glamorous...

Bottlers, for example, choose stainless steel, not because it's shiny and glamorous, but because it's an essential working tool. Using stainless helps assure a flavorful, zippy, pure drink because:

STAINLESS resists corrosion during the bottling process.

STAINLESS leaves foods strictly alone. It eliminates the possibility of metal ion contamination.

STAINLESS fights abrasion and erosion.

STAINLESS is strong.

They're all good reasons why stainless is your best choice for any type of food processing equipment. And, while stainless does the tough, unglamorous jobs more efficiently, it can also turn your plant into a sparkling showplace. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Canadian Distributor — Railway & Power Engineering Corp., Ltd.

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NEW PACKAGES & PRODUCTS

Designers Select Top Food Processors

Sixteen food processors' packages were among winners of the Third Package Design Awards Competition, selected by panels of designers, engineers, and consumers.

TOP WINNER in food category was the Stop and Shop line, designed by Morton Goldsholl and John Weber.

Certificates of Merit

Procter & Gamble's Fluffo package (Donald Deskey Assoc.)

Hillman's Pure Food Stores bakery and candy packages (Morton Goldsholl and John Weber)

Pepperidge Farm Inc.'s cookie line (Jim Nash Assoc.)

Birely's Capri bottles and carrier (Jerome Gould)

Gretz canned beer line (John Milligan)

Gunther Beer's carriers (Mary Anne Pfenninger)

Golden Age beverage line (Smith, Scherr, and McDermott)

Weiland Packaging Co.'s meat line (Wilbur E. Johnson)

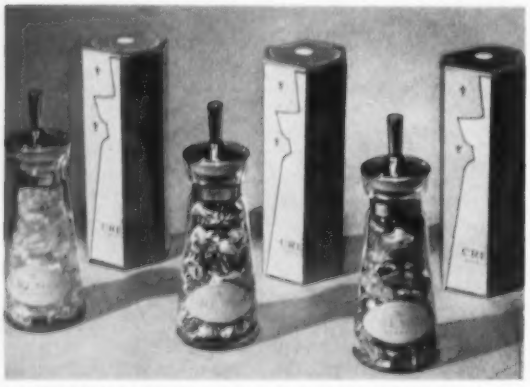
O'Keefe beer line (Raymond Loewy Assoc.)*

Lever Bros. Good Luck margarine package (Lippincott & Margulies)

Whitman's Pinwheel Candy boxes (Raymond Loewy Assoc.)

Eckrich meat packages (Robert Sidney Dickens)

* For redesign



CANDY DECANTERS designed by Robert Zeidman Assoc. took first award in candy category for Cresca Co.

BREWERS LINE was designed by Raymond Loewy Assoc. The O'Keefe Breweries line took first prize in the beer and soft drinks category.

RIB FOIL CUPS of Kraft Foods were designed by G. L. Canfield. They took award for best use of aluminum.

real Southern cooking . . .

SO LIGHT YOU SERVE IT WITH A SPOON, NEW WASHINGTON SPOON BREAD MIX IS PROTECTED BY TWIN POUCHES OF RIEGEL'S POLY-COATED POUCHPAK*... PERMITTING HALF OF CONTENTS TO BE SAVED FOR LATER USE. *TM.

Protecting the sales-winning qualities of fine products is only one of the many functions of Riegel papers. Saving money is important, too. Riegel does it for you by creating the right combination of the most efficient packaging materials... and by "tailor-making" the paper to run and seal at high speeds on your machines. Tell us what you want paper to do for you. Riegel Paper Corporation, P.O. Box 170, Grand Central Sta., New York 17, N. Y.

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Foil Linings Aid Food Shippers

Increased efficiency and economy are the two top advantages offered to food processors with the development of two new shipping containers using aluminum foil.

A multiwall bag lined with aluminum foil makes it possible to substitute inexpensive paper sacks for standard metal or fiber drums. Developed by Hudson Pulp & Paper Corp., the foil-kraft laminate is called Foil-Wall. Foil is made by Aluminum Co. of America.

The bag requires less warehouse space than a drum, costs less, and requires less handling. It offers moisture vapor protection and odor and gas resistance. 22A

A new aluminum foil-lined corrugated box which is reported to control temperature without ice, has been developed to cut costs for a processor of tray packed chicken parts.

Aluminum Co. of America, Stone Container Corp., and American Cyanamid Co. joined forces to develop the carton for Rockingham Marketing Cooperative, Broadway, Va.

Called Sta-Temp, the box is reported to offer 100% more temperature control than a plain corrugated container, regardless of outside temperature.

Made of corrugated boxboard with an outside layer of .00035 foil, the box is made in one piece with a fold-over top. Each box holds 12 polyethylene overwrapped trays of cut-up chicken. Protection of the birds is further enhanced with the addition of Aconize, a bacteria retarder.

The carton results in significant savings in weight, space, and handling, as well as added appeal to the shipper. 22B

Circle key numbers on Reader Service Card

New Tea Concentrate

First product marketed by newly formed American Brands is 2 Sec'n Tea, an instant liquid pure tea concentrate. The product has been successfully test-marketed for four years under a private label.

The tea concentrate is packaged in 1 pt. and ½ pt bottles. The 1 pt. size will make 32 cups of tea.

Folded Fish Dinner

A complete fish dinner processed by Red L Foods Corp. is packed in a "Fold-A-Tray" package which saves the food store operator about half the space for conventional trays.

The compartmented tray holding the dinner is folded in half before placing it in the carton.

The dinner consists of two french-fried haddock fillets, whipped potatoes, and peas with butter.

Pre-Cooked Seafood Mix

Five seafood favorites make up General Foods new Birdseye precooked seafood mix: Sea scallops, fish bites, fish sticks, shrimp, and sea clams. An 8 oz. carton serves two people. The frozen product is packed in aluminum foil for easy heating.

Three More for Baby

Two top baby-food processors have added new products to their lines:

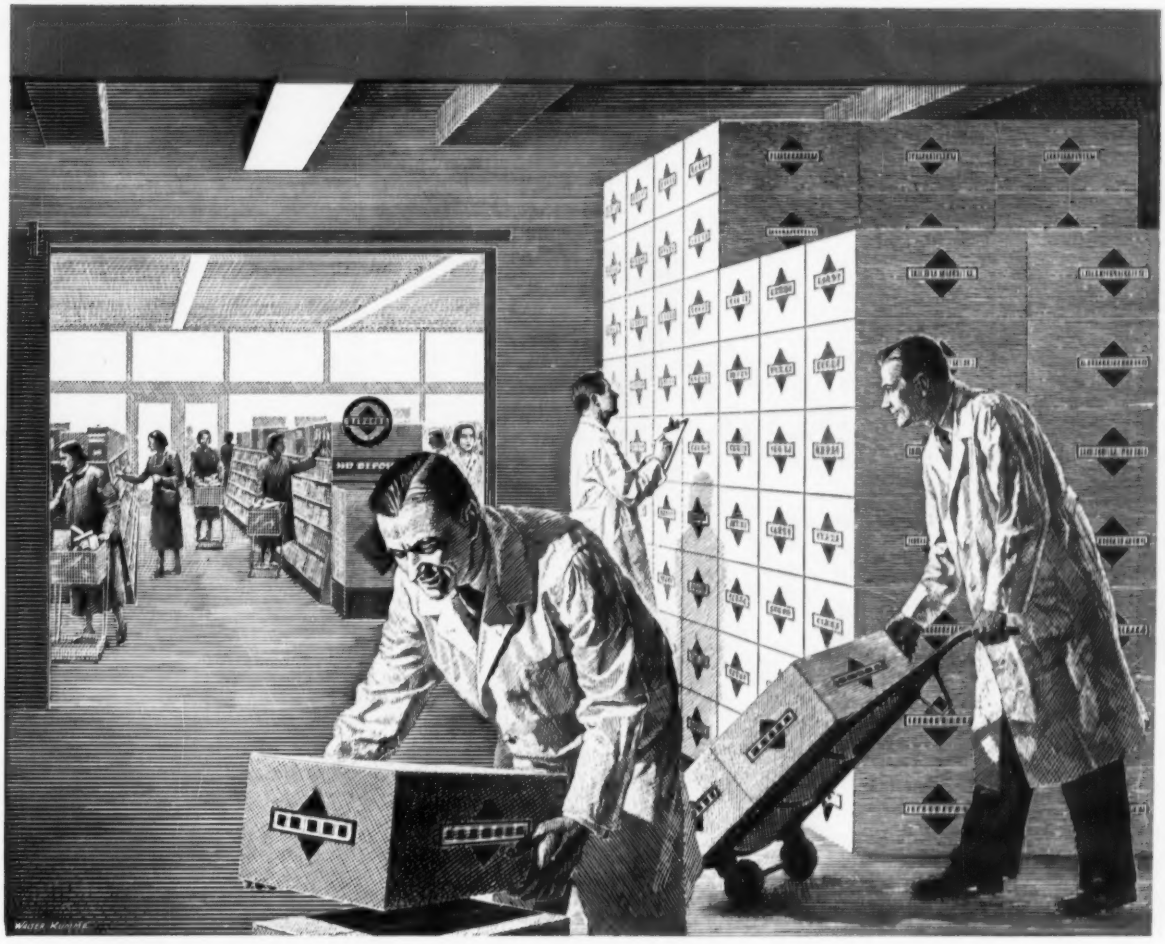
H. J. Heinz has adapted a favorite adult dinner to the young diner's menu with introduction of a strained chicken noodle dinner. Product is blend of chicken, chicken broth, dehydrated onions, carrots, egg noodles, wheat flour, whole milk solids, vegetable oil, and salt.

Also new on the market is Heinz Junior Chopped Chicken, packed in 3 oz. clear glass containers.

Gerber Baby Foods now offers a new strained apple juice developed after extensive research and consumer field tests. The pasteurized juice has a guaranteed Vitamin C content. Package is a can.

Enters Institutional Field

Four multi-use soup bases and sea sonings have marked the entrance of General Foods into the institutional product field. Marketed nationally under the Good Seasons label, the products are chicken flavor with



WIN IN THE BATTLE OF BRANDS

There are more than 150,000 brand names registered in the United States—competing for the customer's attention.

In this "battle of brands" brightly printed Gaylord Boxes are a vital link in the chain of visual impressions that pays off in sales.

This is true because Gaylord excels in printing. Gaylord has the specialized experience and equipment to make quality boxes do their selling best—with your brand name accurately expressed in eye-catching colors.

Put Gaylord Boxes on your selling team. Call your nearby Gaylord office.

Gaylord Boxes

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES • KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION ★ ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION

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FLAVOR PLAYS A LARGE PART in the full enjoyment of a picnic luncheon. That's because typical picnic fare consists largely of food and beverage products which derive much of their appetizing appeal from the skillful use of selected flavors. In fact, the *superiority* of any of these products – *cold cuts, sandwich spreads, frankfurters, pickles, relishes, jams, flavored drinks, cakes and cookies – usually lies in the use of special flavoring blends carefully chosen or custom-made for a desired effect in a particular product. If you have flavoring problems and need the seasoned assistance of specialists remember FRITZSCHE . . . a first name in flavors since 1871. Remember also: *Your product is* ONLY *as good as its* FLAVOR!

*Write Dept. FE for Flavor Data Sheets on any of these subjects

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BRANCH OFFICES *and* *STOCKS: *Atlanta, Georgia, Boston, Massachusetts, *Chicago, Illinois, Cincinnati, Ohio, *Los Angeles, California, Philadelphia, Pennsylvania. San Francisco, California, St. Louis, Missouri, Montreal and *Toronto, Canada and *Mexico, D. F. FACTORY: *Clifton, N. J.*

chicken fat, chicken with chicken meat, beef flavor, and onion.

All but the onion flavor are packed in 1 lb. glass jars. The onion is packed in an 8 oz. jar.

Only the addition of boiling water is needed to make soup, sauces, or gravies.

Foil "Double Boiler"

New package for Gunsberg Bros. Packing Co.'s corned beef is an unusual foil "double boiler".

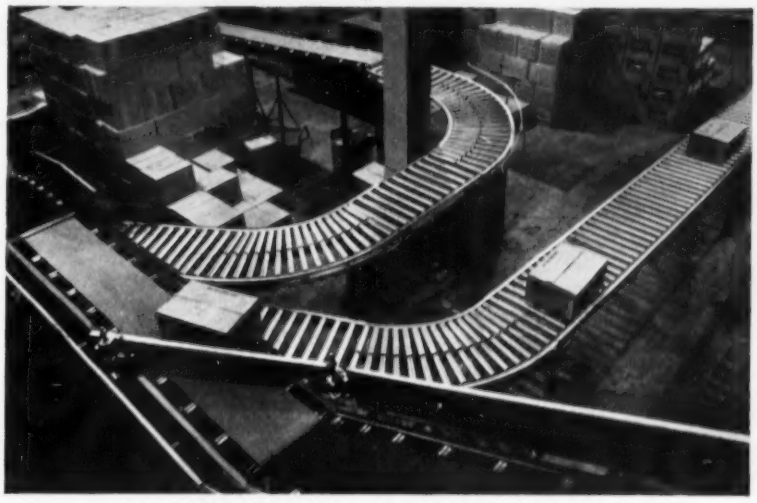
The package is made in three parts: an outer pan which holds 4 oz. of water, a perforated insert which hold the meat, and a lid. The consumer adds water and heats the meat in the package, saving 2-3 hr. in preparation time.

The 6 oz. package holds four servings. Package was developed by Sutherland Paper Co.

Circle 27A on Reader Service Card

QUICK QUAKER OATS is now available in a new one-serving portion pack. Designed for institutional use, the oats are mixed with one cup of boiling water and cooked for 2 min. Salt is added during processing.

Ask Standard how to cut costs with conveyors



Order picking is expedited and simplified by this Standard system of roller and belt conveyors in large warehouse.

Roller and belt conveyors ease warehouse traffic jams

FAST flow of goods and simplified labor add up to more profitable warehouse operations.

Standard offers a wide variety of gravity and powered, permanent and portable conveyors — that can help you establish smooth, more profitable warehousing.

Spend a few moments with a Standard engineer. He'll show you how inexpensive Standard conveyors give you maximum flexibility at minimum cost. He'll show you, too, how Standard conveyors provide the many advantages of a custom-designed system at low cost. For the name of your nearby Standard engineer write STANDARD CONVEYOR COMPANY, General Offices: North St. Paul 9, Minn. Sales and Service in Principal Cities.

Write for Bulletin 309. Address Dept. D-3 or contact the Standard engineer listed in your classified phone book.

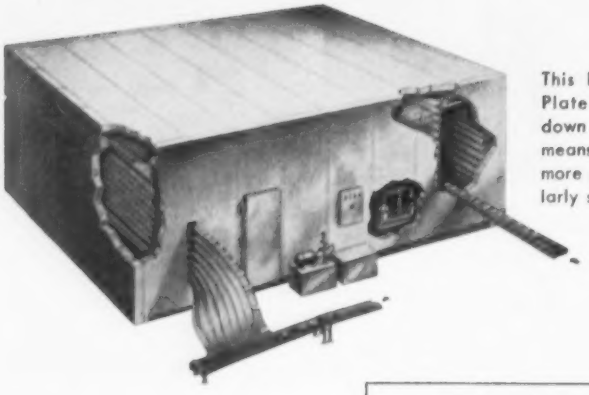
(LEFT) Belt-booster in a gravity roller conveyor "order picking" line. (RIGHT) Lift or lower floor-to-floor with an INCLINEBELT. Available in a wide range of heights and belt widths.

For more data, circle this page number on card at back →

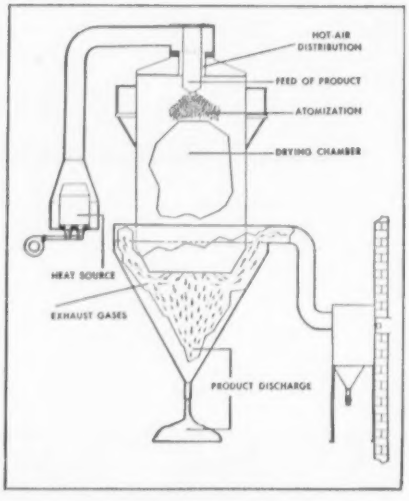
PERFORMANCE IN FOOD PROCESSING —GUARANTEED BY PROCTOR

From −55°F. to 240°F. For Liquids, for Solids.

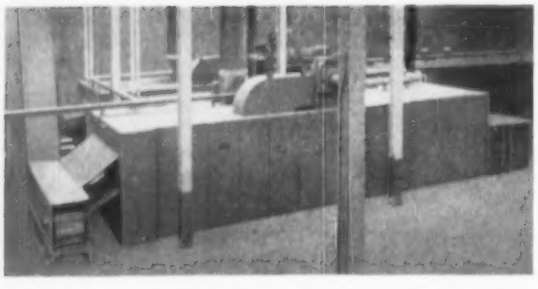
Every Proctor product for the Food and Process Industries carries the famous Proctor performance guarantee, based on wide experience and a careful analysis of product requirements. Proctor's new Continuous Plate Freezer too, is guaranteed for the same high production rates and top product quality—it too features the same reliability, the same operating economies, the same product uniformity found in all Proctor products.



This Proctor Continuous Plate Freezer operates down to −55° F.! This means quicker freezing, more production of regularly shaped packages.



Proctor Spray Dryers are designed and built to suit the requirements of your product—from pilot plant scale to large production units.



Proctor Drying Ranges are built to achieve uniform drying—the key to product quality.

PROCTOR & SCHWARTZ, INC.
PHILADELPHIA 20, PA.

Proctor

Packages & Products

Dispenses Boxed Wieners

A frankfurter on a roll, complete with mustard and an individual carton, is dispensed from a new United States Vending Machines Corp. machine.

Upon insertion of the coin, a hot dog is cooked and served in 20 sec. Each machine holds 140 frankfurters.

The individual cartons are imprinted with the brand name of the meat processor. Mustard is packaged in a film envelope that holds one serving.

Circle 28A on Reader Service Card

Beans in Foil Tray

A 10 oz. package of pre-cooked beans is now marketed in a foil cooking tray with a crimped-on cardboard lid. By placing the beans in the tray and heating for 30 min., the consumer can prepare 6 generous servings of home cooked beans.

Processor is C. H. Runciman Co., Lowell, Mich.

New Product Shorts

Switch to Cans has been announced by Temple Frosted Foods, Inc., for its line of Chinese soups.

Swirl Design has been developed for Clicquot Club Co.'s 12 oz. soft drink bottle.

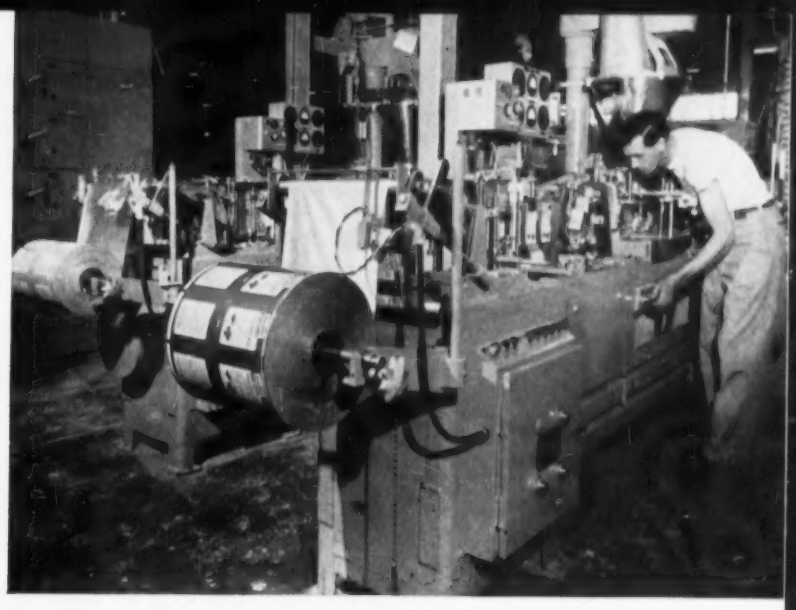
Sixth Salad Dressing flavor added to Goods Seasons mix line is American French.

Frozen Macaroni and Cheese is marketed by the Creamette Co., Minneapolis. Overwrapped chipboard carton holds 8 oz. of product in a foil pan.

Half-Size Mix called Li'l Angel is new Betty Crocker product which makes just enough angel food to fit in a regular bread pan.

Chicken-Part Line is being test-marketed by Campbell Soup Co. under the Swanson label.

Baked Alaska is newest product of H. P. Hood Dairies.



polyethylene packaging for General Mills

...assures strength plus moisture-proofing

. . . Before General Mills startled the industry with the introduction of its new Betty Crocker Answer Cake Mix, the 6 serving cake packaged with its own baking pan, they were faced with new packaging problems.

Three separate units—the cake mix, frosting mix and the baking pan—had to go inside one paper carton. And of course the two mixes had to be individually packaged and tightly sealed in strong, moisture-resistant materials.

The use of polyethylene-foil liner for these printed paper mix pouches assures a tight heat-seal. It means good moisture-proofing, extra strength. It assures the same quality product on the grocer's shelf and in the consumer's home that is compounded under controlled plant production.

Investigate the advantages of marketing food products packaged in materials made with polyethylene. See your packaging supplier . . . ask him to use BAKELITE Brand Polyethylene. Or write Dept. WH-63.

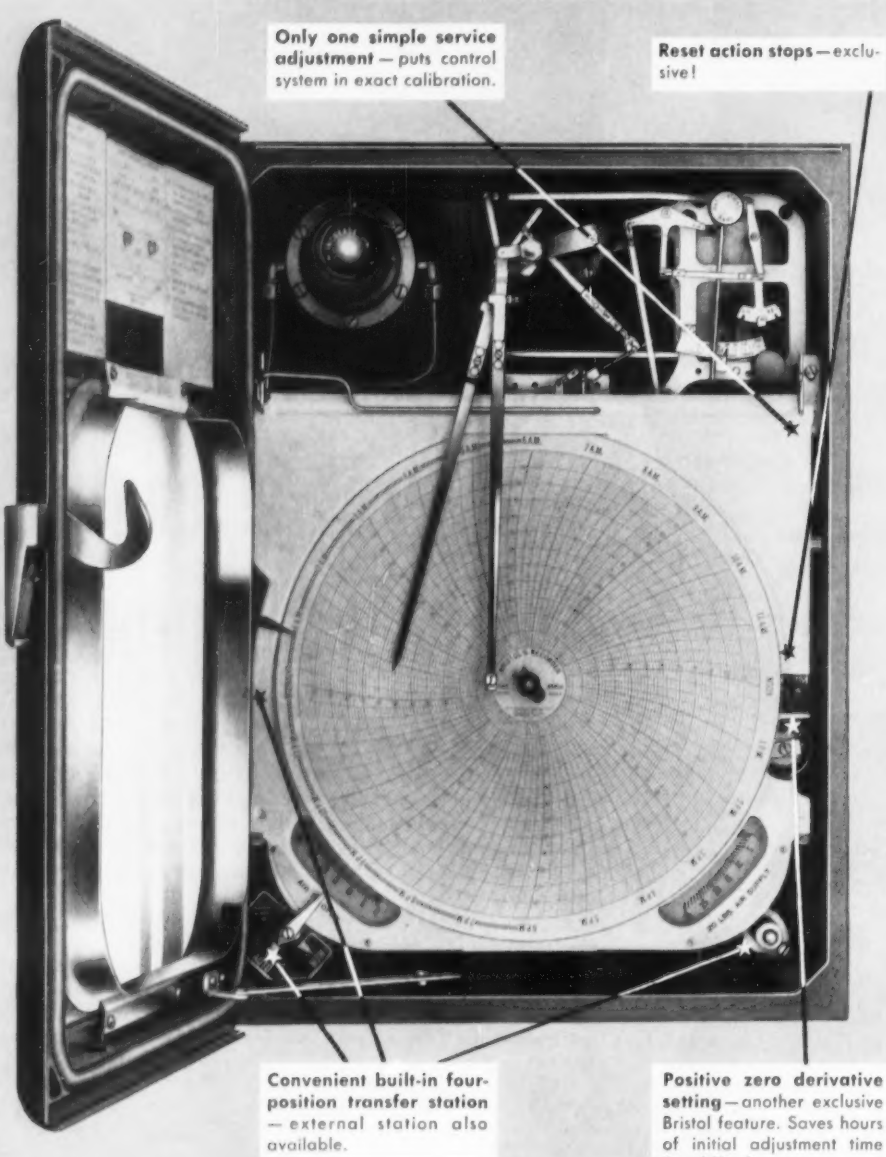
It pays to package in material made with

BAKELITE
BRAND
Polyethylene Plastic

BAKELITE COMPANY, *A Division of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N. Y.

The term BAKELITE and the Trefoil Symbol are registered trade-marks of UCC.

Are you sure you


Only one simple service adjustment — puts control system in exact calibration.
Reset action stops — exclusive!
Convenient built-in four-position transfer station — external station also available.
Positive zero derivative setting — another exclusive Bristol feature. Saves hours of initial adjustment time for difficult processes.

MADE IN MODELS FOR THESE CONTROL MODES:

1. **Fixed narrow band** (on-off).
2. **Proportional**—to 100% and to 30%.
3. **Reset with wide band**—rates 0.1 to 10 or 1 to 300 repeats per minute. Proportional band to 400%.
4. **Derivative** (rate)—Derivative time 0.2 to 20 min., plus zero derivative setting.
5. **Reset plus derivative**—proportional band, reset rate and derivative time as shown above.

WILL HANDLE THESE CONTROL PROBLEMS:

1. Cascaded control
2. Selective control
3. Ratio control
4. Time-program control
5. Pneumatic transmission.

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are getting the best in pneumatic controllers?

Before you buy another controller check these advantages of the new Bristol Series 500 Free-Vane® Pneumatic Controller

FINEST MEASURING ELEMENTS

Bristol Series 500 Pneumatic Controllers are equipped with precision Bristol measuring elements—the widest selection of high-quality measuring elements available with any line of control instruments. You'll find models for control of: **temperature, pressure, vacuum, draft, absolute pressure, liquid level, flow, humidity, density, pH, and a large number of other variables measurable with electronic potentiometers and bridges.**

The sustained, predictable performance of Bristol measuring elements is one reason why you'll find more Bristol recording pressure gauges in use *than all other makes combined.* The new, completely linear Bristol Dual-Filled Vapor Pressure Measuring Element used in Series 500 Thermometer Controllers is the first really big advance in this field of measurement in 25 years. The Bristol Absolute Pressure Element, available in ranges as low as 0-6 mm of mercury absolute, also leads in its particular field. These are just a few of many examples of Bristol leadership in the development and improvement of measuring elements.

ADVANCED CONTROL SYSTEM FEATURES

Many features *found on no other pneumatic controller* assure better control with the Bristol Series 500: Reset action stops on reset models prevent loss of control due to prolonged deviation from set point; true zero derivative setting (on derivative models) can save hours of initial adjustment time; easy shift to wider proportional band (½ to 200% or 1 to 400% on wide band models) *without recalibration.*

BEST MAINTENANCE RECORD

One simple adjustment puts a Series 500 controller in exact calibration.

Basic simplicity, accurate design, closely held manufacturing tolerances make this single adjustment all that's necessary—even after complete disassembly and reassembly with replacement parts.

Bristol Series 500 Controllers on the job in new modern processing plant. Absolute pressure, steam flow, and liquid levels are variables controlled here.

This practically "built-in" calibration is typical of the foresight and engineering planning that make the Series 500 the easiest pneumatic control system on the market to service. Cut-and-try methods are eliminated. No special maintenance skills are required. All parts are completely interchangeable. The result: a truly superlative maintenance record in thousands of industrial plants.

NATION-WIDE SERVICE

Series 500 Controllers are backed up by the kind of service a quality product requires. The facilities of the main factory, four strategically-located branch factories, and factory-trained service engineers operating out of 44 principal cities across the United States and Canada are on call whenever and wherever needed to help you get the most out of your Bristol Pneumatic Controllers.

GET COMPLETE INFORMATION

. . . on the Bristol Series 500 Pneumatic Controller before you buy another instrument! Fully described in Bulletin A130. Write: The Bristol Company, 115 Bristol Road, Waterbury 20, Conn. 4.76

*T.M. Reg. U. S. Pat. Off.

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AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

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We'll test it at our expense

IF LIQUID SEPARATION, LUMPY TEXTURE, UNEVEN DISPERSION OF INGREDIENTS are problems you face with *your* products—pass them on to us. We've successfully tested—free of charge—all the products you see here, and then some.

HERE'S ALL YOU DO: Just send a sample of your product. We'll run it through a production model "Superhomo" homogenizer in our lab—at various temperatures and pressures. When we find the "combination" that gives you a permanently blended, smooth, well-dispersed, lump-free product ready for market, we'll return your labeled homogenized sample with a complete written report of the tests.

Have a free "SUPERHOMO" test on us

Send us a 5-gallon sample of your product for homogenization testing. Or if you prefer to conduct your own test, we'll gladly rent you a "Superhomo" at nominal cost.

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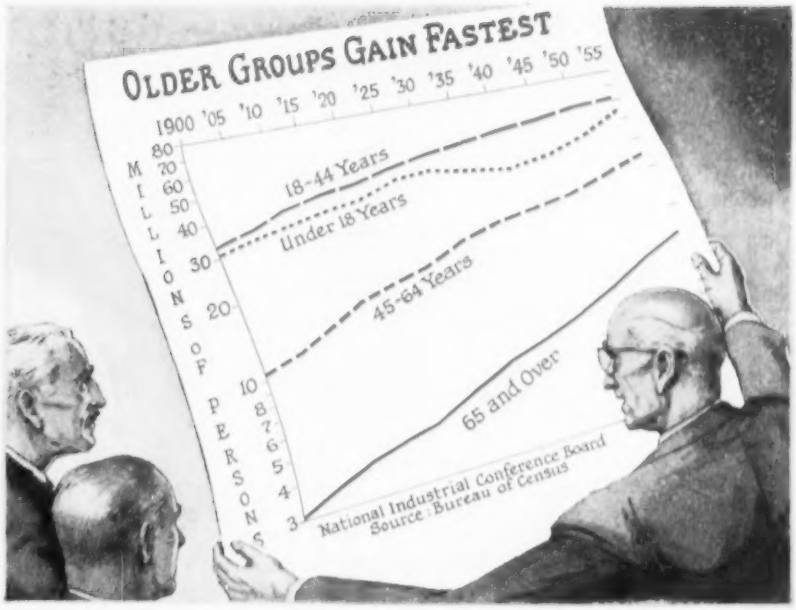
Dairy • Food • Farm • Beverage • Brewing • Chemical • Equipment and Supplies

SALES AND SERVICE IN 58 CITIES—U.S. AND CANADA

Ole Sage Episode


OLDER GROUPS GAIN FASTEST
1900 '05 '10 '15 '20 '25 '30 '35 '40 '45 '50 '55
MILLIONS OF PERSONS
80 70 60 50 40 30 20 10 8 7 6 5 4 3
18-44 Years
Under 18 Years
45-64 Years
65 and Over
Source: Bureau of Census
National Industrial Conference Board

"Here," said Ole, as he placed a large chart on the wall, "is a picture of the upward shift of age groups since 1900. And note particularly how the 65-&-Over group has jumped some 500%!"

What About Hiring Workers Who Are Over 45?

IVAN C. MILLER
"Food Engineering"

"SURE BURNS ME UP!" complained Personnel Manager Milt Sorenson. "Today I had to turn down one of the most likely applicants I ever interviewed."

At this statement, Batt Bulwark, works manager at Mull & Mull, slapped down his soup spoon. "You should *never* have let a likely one get away," he blared across the table, "considering that all we're usually handed by you personnel people is the leavings–barrel scrapings."

Milt refused to be ruffled. "Well, before I explain why I didn't hire him," he said, "let me tell a few things about him so you Guff & Gripers can judge: Claimed he was physically fit, and certainly looked it. Diversified experience–just what we need. Also, I could see for myself that he was alert and personable. I liked him right off. And finally, though he'd been a foreman at his last place, he was willing to start as a worker—at almost any job."

"Sounds phony," cracked Batt. "Anyone of that caliber would have a job–a good one, too–and not be unemployed and begging for just anything. Why don't you tell us the rest, Milt–that he was fired for getting drunk and socking the boss."

"On the contrary," came the reply, "I just wish I could be certain that if I left my company I'd get as strong recommendations. They gave him a clean bill, stating he'd quit his job and moved here with the idea of improving his wife's health."

Milt continued: "We now have a great need for an assistant superintendent. Of course, company policy is to advance only from within. However, I sure wish I could have put this man on that job. I'd bet my bottom dollar he would handle it better than the fellow I'll have to assign."

"Okay, so he's tops," snapped Batt. "But let's end the mystery, Milt. Why didn't you hire him?"

"Nothing more than the fact that he's too old," said Milt, slowly shaking his head. Then he went on: "Mike Morgan is his name. Says he's 46, whereas company rules say we can't hire anyone a day past 45."

"Too bad Mike wasn't a good liar by about two years," Batt sympathized.

"Don't you have any leeway for expediency?" queried Zenith Canning's personnel director, Silas Worth.

"Unfortunately, no", was the answer. "When our management makes a rule–any rule–it's enforced." Then Milt hurriedly added: "I'm not implying a criticism. Although our outfit's somewhat inflexible, it's nevertheless just, at least by management's own standard."

Batt spoke up again: "Good liars to the contrary, I back your management's views. I want my men young and husky. When it's your job to get out production, you can't depend on the old and the weak. After all, business is business. Bankruptcy's always hot on the heel of 'no profits'. So I say, let the old ones go on pension."

"Even if only Social Security?" asked Si.

Before Batt could answer, Milt injected: "The 'no hire beyond 45' rule was made by our company when it started its pension plan. The age-limit rule is a result."

"Say," said Si, "wasn't it you, Batt, who was complaining about getting 'leavings and barrel scrapings'? You seem to forget that the food industry, with its narrow profit margin, often finds it hard to compete for the best in the labor market, particularly in the big-pay areas."

Ole now made his first contribution: "The whole subject of employee

"The shift in the personnel supply means we can't afford to waste our older manpower"

age, in both hiring and retiring, is one of the most serious of industrial problems. And accordingly it's a grave matter for the nation.

"Pension plans are not new in industry. Management has shown an increasing awareness of its responsibility to provide some measure of security for workers who've given long and loyal service. What's more, management is *willing* to do so. This was shown by foresighted organizations before pensions became a bargainable demand of unions.

"One selfish reason for management's willingness has been the aid, at least presumed, of such plans in procuring and holding employees. Furthermore, monies paid into pension funds are tax deductible.

"What've pensions got to do with not hiring those over 45 or 50?" broke in Batt.

"According to the Department of Labor," answered Ole, "in order that an employee may be paid (through insurance) $100 per month on retirement at 65 years of age, a company must lay aside $326 per year if the employee is hired when he's 30 years old, $508 if hired when 40. And for an employee hired when 50, the annual cost would be $939, and $1,486 if he's taken on when 55."

"Well, I guess I got told that time," grumbled Batt.

"And now, on this pyramiding growth of pension plans, resumed Ole: "Since NLRB and the courts ruled pension plans bargainable, unions have had a heyday adding pensions to the fringes.

"Retirement plans now cover more than 40% of the country's non-agricultural workers. As a result, a measure of security in old age is now assured to approximately 22 million employees in more than 20,000 organizations. And the number is being swelled every month.

"Monies put in reserve to pay out on the plans now near $27 billion. At the present rate of growth, they'll pass $60 billion in another ten years."

"There you go again, Ole," exploded Batt. "Rolling around in billions, just like they were pennies. I never knew it to fail! Actually, whose billions are they? And where did they come from?"

"American industry has shelled out those billions," volunteered Milt. "And it'll continue to shell out many more. Mostly these funds are in trust in banks or with insurance companies. A worthy cause, yes. But it sure is two-edged."

"How's that?," asked Batt.

"Well, pension plans do provide for workers' retirement years. But they also make unemployable many excellent workers. The victims are experienced, capable people—often out of work through no fault of their own, right in their prime—45 to 50."

"My idea of prime," insisted Batt, "is the years between 20 and 40, and that's longer than baseball, the boxing ring, or the Air Force gives 'em."

Milt differed. "You overlook vital factors, Batt. You can't justly compare sport and military flying requirements with the needs of industry. Right, Ole?"

"I agree," Ole emphasized. Several factors make things different—for one, the reduction in hours of the work day and work week; the other, the fact that labor-saving machines and equipment now cut down the number of employees required to 'get out the production,' as Batt puts it. Also, such machines make almost all jobs easier, less tiring."

"Isn't that the truth!" Si Worth agreed. "Right now, control by instruments and pushbuttons is putting the emphasis on the use of the head more than the back muscles."

"You got a big point there, Si," said Milt. "Mechanization in the food industry is moving ahead faster than most of us realize. In fact, it's becoming a problem to keep informed on the advances."

"Just one example of plant modernization and mechanization," continued Milt, "is that big new baking plant in Philadelphia."

"And I'll bet Ole can remember," Si cut in, "that it was hardly more than 20 years ago when potato chip production, to name just one product, was still in the kitchen-operation stage. But look at its mechanization now!"

"I'm sure," chuckled Ole, "that even Batt will admit there's much less need now for bull strength."

For once, Batt merely nodded. And Ole continued: "You're all generally familiar with the fact that a man's life span—life expectancy—has increased unbelievably as the result of improvement in general health."

He pulled out his notebook and read: "'A child born in the U. S. in 1900 had a life expectancy of less than 50 years—whereas an infant born today may expect to live to be 70 years old.'"

"Who says so?" demanded Batt. "Sounds like figures out of a hat."

"The first figure," replied Ole, "is from the Census Bureau, while the latest life expectancy—actually 69.8 years—is based on the mortality experience of Metropolitan Life Insurance Co.'s industrial policy holders as of 1954. My raising the figure to 70, as of today, is no doubt low.

"Now here," said Ole, unrolling a large chart and placing it on the wall, "is the National Industrial Conference Board's picture of the trends, based on census figures. It shows the upward shift of age groups since 1900. And note particularly how the 65-&-over group has jumped some 500%. This chart has been scaled in ratio to show the percentage jumps in their real light.

"To go on: In 1900, 25% of those in the productive-years group (18-64) were over 45 years old. By 1955, this older group rose to 35%. At the same time, the percentage of the 18-44 group available for work has fallen due to many postponements in starting work, such as increased years in academic training and military service. In addition, the proportion past 65 continues to rise."

Ole paused to roll up his chart, then added: "These trends, which apparently will continue, mean a greater and greater pressure to call on the group between 45 and 64. And we can't afford to waste any of this manpower that's usable."

"You've got me figure-groggy," grumbled Batt. "And besides, it's now my go-time. You other fellows stay. But I'm on may way."

"At the next meeting," suggested Milt, "let's first finish the subject of hiring workers past 40-45, and then consider that matter of 'required retirement.'"

"Okay," chorused most of the others as the luncheon broke up.

At this point, Bertram Barnastian, senior partner of Barnastian Bros. Baking Co., pulled Sorenson aside and pleaded: "If it isn't too late, Milt, please see if you can locate that 'old man of 46'—Mike Morgan, the fellow you turned down—and send him to us. Most of our crew are green. So we can use a man who knows the shoals."

On the go . . . always going . . . seldom gone

Thousands of hours have gone into engineering better performance into this new *Clarklift*. Many of those hours were spent getting *down* time *out* of it. The results are qualities you *can't* see readily—a ruggedness of construction that defies the punishment of the most severe service. And so the *Clarklift* goes . . . and goes . . . and goes.

What's more, there's unmatched performance built into this truck. Safety, too. And when we say routine maintenance, we mean *routine*. And these are things you *can* see—either on the truck itself or in performance records. Or in savings that will set entirely new records for the lift truck industry. Try this new *Clarklift*. You'll see what we mean.

Industrial Truck Division
Clark Equipment Company
Battle Creek, Michigan

CLARK® EQUIPMENT

B.F.Goodrich Procter & Gamble Morrell Borden's Schenley

Vilter®

General Mills CANADA DRY ATLAS

PET Rath AMERICAN CYANAMID MARATHON

OLIN MATHIESON Kodak Kimberly Clark Swift SHELL

Allied Chemical FALSTAFF Gerber Blatz A.O.Smith Phillips

Serving the "500"* is a stimulating challenge to QUALITY

"SELLING" big business is a real challenge to our ingenuity, craftsmanship, engineering, and research. To sell to companies whose standards are always high demands constant alertness from us to improve our line of refrigeration and air conditioning equipment.

Now, what does this mean to the many users, big or small, of Vilter equipment?

It means sound engineering, equipment designed to do the required job, and more—it means sound metallurgy that provides metals that stand the strains and stresses of daily operation—it means careful workmanship that accepts no departure from rigid standards—it means sound application analysis that fits the product to the job—this is the Vilter code—this is the Vilter standard that has won the respect and business loyalty of thousands of customers the world over.

Dairies, meat packers, breweries, frozen food processors, chemical companies, hotels and many others have found the Vilter trademark synonymous with economical, dependable, year-in, year-out operation.

For a careful appraisal of your air conditioning or refrigeration needs, call on us to give you the analysis of your requirements and our recommendations as to the equipment that will best serve your needs.

* A large proportion of America's largest industrial corporations are Vilter customers as determined from the FORTUNE Directory of the 500 Largest U. S. Industrial Corporations, July, 1956.

REFRIGERATION AIR CONDITIONING 1867 1957 Vilter 90th Year

Vilter®

QUALITY CRAFTSMANSHIP that lasts...

ENGINEERING DESIGN that guarantees performance

REFRIGERATION and AIR CONDITIONING

THE VILTER MANUFACTURING COMPANY, Milwaukee 7, Wisconsin

Air Units • Ammonia & Freon Compressors • Booster Compressors • Baudelot Coolers • Water & Brine Coolers • Blast Freezers • Evaporative & Shell & Tube Condensers • Pipe Coils • Valves & Fittings • Pakice & Polarflake Ice Machines

Why will a CLARKLIFT hold up longer?

Can you be sure that a *new* model truck will (1) perform better and (2) *stay* on the job with less time out? You can with the new *Clarklift:* Clark has built over 250,000 lift trucks . . . far more than any other builder. This experience helps us make them better. Then Clark tests the new truck for thousands of hours—equal to many years of actual service.

We've already *proved* the new safety roller-upright reduces friction and wear, has longer life; unitized frame construction with built-in sump and gas tank, providing greater rigidity; a vanadium steel steer axle with greater tensile strength; big rear wheels to reduce shocks from uneven floors. And many more. Ask your Clark dealer for a demonstration.

Industrial Truck Division
Clark Equipment Company
Battle Creek 14, Michigan

CLARK® EQUIPMENT

VITAMIN FORTIFICATION

● The words "VITAMIN FORTIFIED" are a health plus on your label. That health plus can make your soft drinks more welcome at mealtime. And what bottler would not like his product to become a mealtime habit?

Whether or not you aim at mealtime consumption, when you add vitamins to refreshment you give your beverages a big competitive advantage with today's health-conscious consumers . . . *for just a fraction of a cent per bottle!*

Pfizer, a leading producer of vitamins for 20 years, offers you Vitamin C (ascorbic acid) in the most convenient, easy-to-handle forms.

If you add Pfizer Ascorbic Acid to your soft drinks to achieve fortification, you can gain another big advantage. You counteract the color-and-flavor-fading that results from oxidation during shelf time.

Why not let a Pfizer representative tell you the full details on how Pfizer Vitamins can significantly increase your product's sales potential.

CHAS. PFIZER & CO., INC.
Chemical Sales Division
630 Flushing Ave., Brooklyn 6, N. Y.
Branch Offices: Chicago, Ill.; San Francisco, Calif.; Vernon, Calif.; Atlanta, Ga.; Dallas, Tex.

Pioneer and Leading Manufacturer of Vitamins Pfizer

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CUT OUT AND FILE

PRACTICAL IDEAS

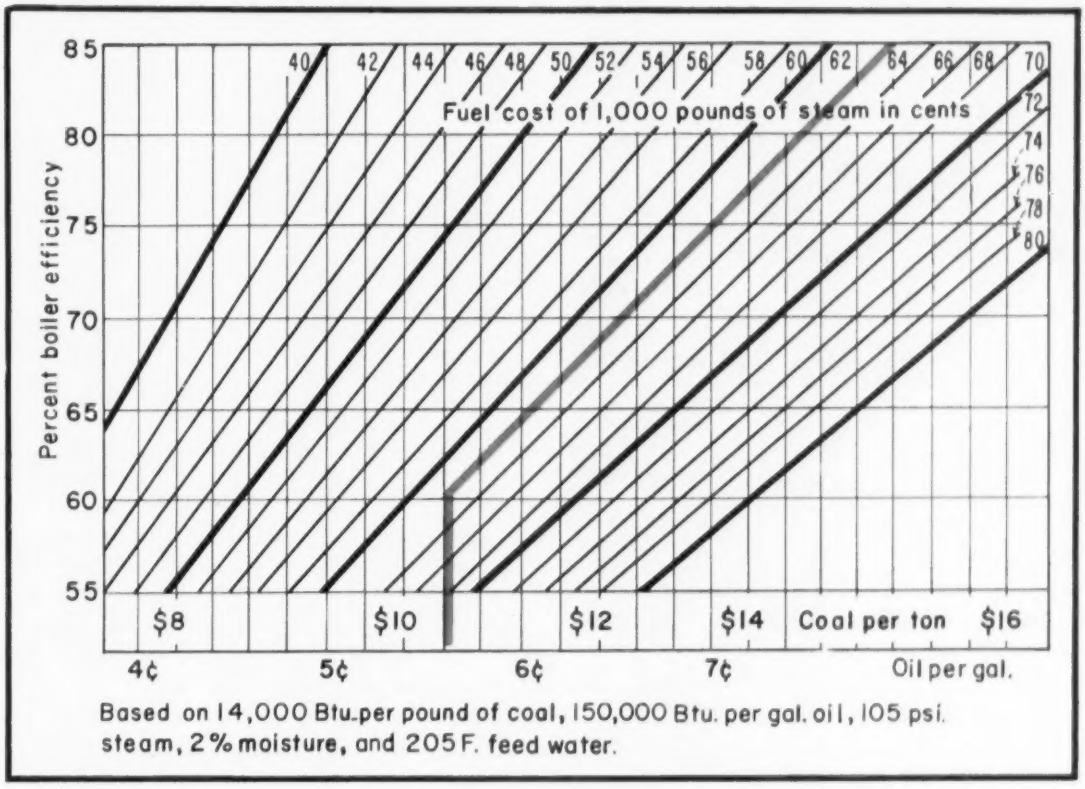


Chart Quickly Compares Costs of Coal and Oil for Steam

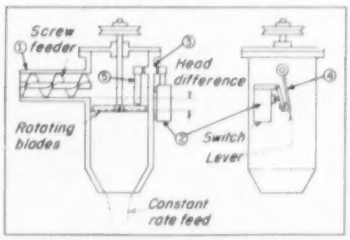
Here's a chart for fast figuring of comparative costs of coal and oil relative to expense for production of steam—and accordingly for gaging savings possible with installation of stoker equipment, new combustion controls, and the like.

The bottom scale shows costs of oil and coal, while the lefthand scale indicates percent boiler efficiency. From where cost and efficiency lines intersect, a slanting line can be followed to the top to get fuel cost per 1,000 lb. of steam.

An example is indicated by a colored line: Assumed here is a plant using oil selling for 5.6c. per gal. and having a boiler efficiency of 60%. From this intersection on the chart, the diagonal line is followed, to give the reading 62c. per 1,000 lb. of steam. Improving boiler efficiency to 75% will (see chart) cut steam cost to 50c—a saving of 12c. per 1,000 lb. of steam.

For an example with coal at $10 per ton, where boiler efficiency is 60%, the reading is 60c.

When your fuel costs are higher than those shown, use one-half the fuel cost and multiply the resulting cost of steam by two.—*"Armstrong Trap", publication of Armstrong Machine Works, Three Rivers, Mich.*



Keeps Filling Head Constant

To maintain a constant rate of a powdery material feed from our filling machine, we found it advisable to maintain a head that is constant within the limits of a slight differential.

This is accomplished by regulating the drive of the screw feed—(1) in sketch—by a Microswitch (2) which is actuated by the swing of a pivoted two-prong lever (3) to stop the drive motor. This latter actuating device is operated, through one prong (4) pressing against the spring return of the switch. This switch is moved by pressure of the powder rising in the feed chamber on the other lever prong (5).—*Robert F. Bardsley, Engineer, General Foods Corp., Hoboken, N. J.*

Meters Save Man-Hours

Since the amount of oil in tanks and the sanitation of these containers are two factors of utmost importance to the production manager of a potato chip plant, we installed three Liquidometers.

These provide a continual visual check of oil supply, thus obviating the need of "sticking" tanks frequently. Also, they decidedly aid in maintaining an efficient cleaning routine.

Two of the units (those seen center and right in photo) measure the vegetable oil in an 8,000-gal. and a 4,000-gal. tank, respectively. (The third meter is employed to gage fuel oil.)

For sanitary as well as supply reasons, when the 8,000-gal. vegetable-oil tank is half empty we pump the remaining oil into the 4,000-gal. unit. This then becomes the process-supply tank. The empty larger tank is now cleaned and then refilled from a tank car.

When the smaller unit has been emptied, it too is cleaned. And meanwhile the larger tank becomes the process-supply unit until, once more, its contents are half used.—*E. F. Bouschor, Plant Manager, Blue Bell Potato Chip Co., Portland, Ore.*

To Reservice Motor Shafts

Often, pulley-drawing tools damage the center holes in the ends of electric motor shafts. When the assembly is mounted between the lathe centers for skimming the commuter, the assembly will run out-of-true. It is then necessary to renew the center holes.

Here's a quick and easy method which insures true running of the shaft:

A steady-rest—comprising a length of hardwood with a hole drilled transversely through it to take the motor shaft—is held in the lathe tool post. The shaft is gripped at one end in a self-centering chuck on the lathe spindle. Since the end of the shaft running in the hole through the hardwood is turning on its own periphery, it cannot fail to run true.

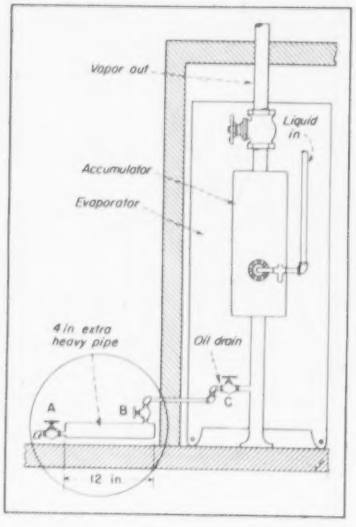
If a standard center drill is used for correcting the center hole at the end of the shaft, it may tend to wobble in unison with the untrue hole. A center drill which has had the small-diameter tip removed will be more stable and can usually be relied upon to remain rigid and remove the metal from the high spots of the center hole.

Plenty of these broken center drills should be available and should be preserved for similar jobs. The center hole can be finished off with a complete and undamaged center drill.

The wooden steady-rest for supporting the motor shaft can be used for other general centering jobs on small diameter shafts. The drill gripped in the headstock chuck of the lathe can be used to drill the required hole through the hardwood, which is fed to the drill along the lathe's saddle.

If the wooden strip is marked so that it is fitted into the lathe tool post with one side uppermost each time, the holes will always be at correct center height. Alignment of the holes transversely can be set by adjusting the lathe's cross slide.

It is much quicker to mount this form of steady-rest in the lathe tool post than it is to fit the standard 3-point steady on the lathe bed and then adjust it.—*C. T. Bower, Tool Engineer, London.*



Draining Refrigeration Oil

Here's a new way to end an old problem—oil in the evaporator of a refrigeration system.

We keep the blower (Niagara No-Frost) in our hardening room free of oil with a trap (12-in. length of extra-heavy 4-in. pipe) located outside of the room. Every day we drain the trap by means of two extra valves (A and B in sketch).

When in operation valve A remains closed, but valves B and C are open. To drain the oil we close

CAN YOU USE $50?

Then here's an opportunity to get it.

Send one of your ideas to FOOD ENGINEERING.

Each month $50 is presented to someone like you for the best item in this department. And the chance that it will be you is now running about one in ten.

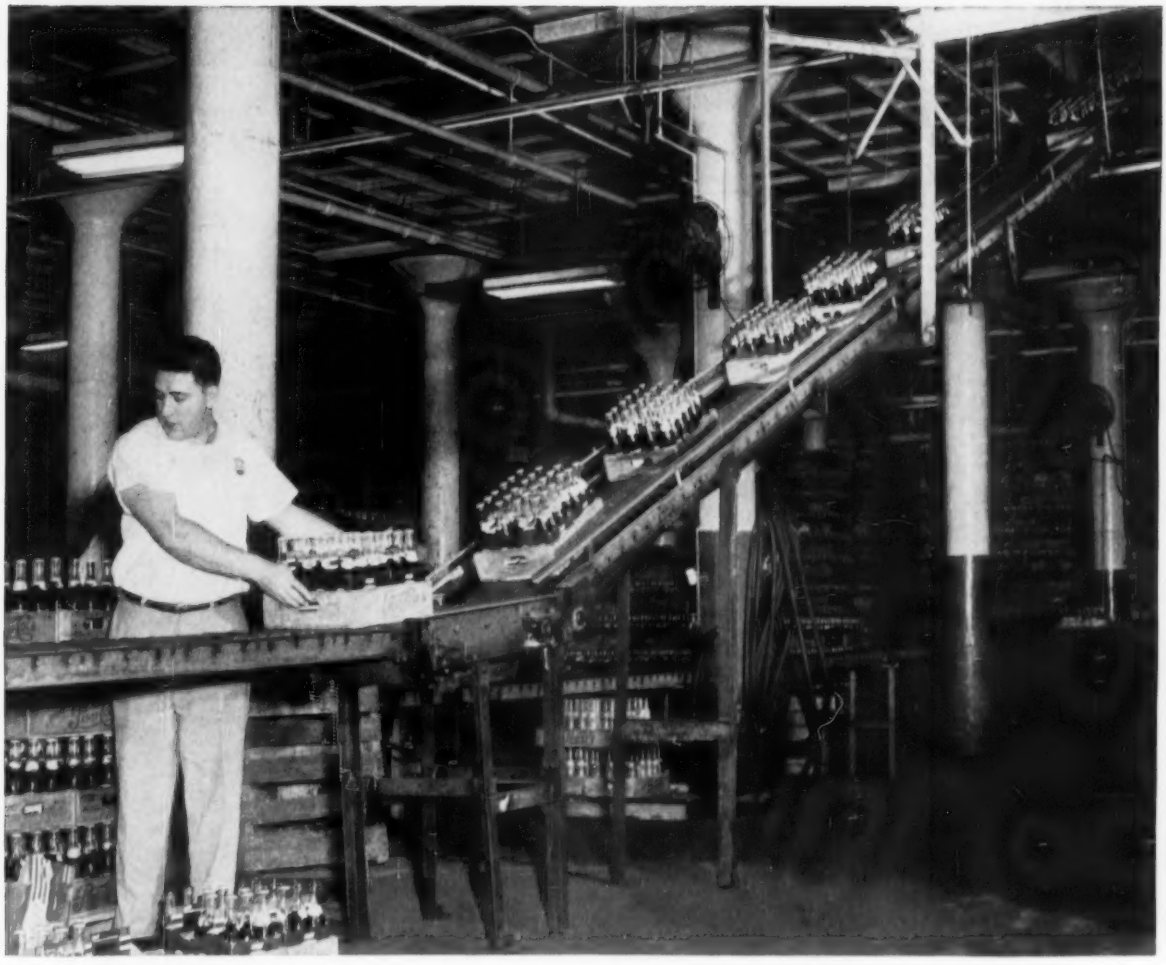
Also $5 to $15 (sometimes even more) is paid for each contributed item used. So a few minutes time may net you as high as $65.

Just send us the facts about your idea and its application. And include a free-hand sketch or snapshot to illustrate it.

We'll do the finished writing and drawing for you. Send it today, before you forget. Address it to Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.—The Editors.

PRACTICAL IDEA WINNERS will be chosen by READEX, a foremost outside survey agency that regularly polls many scores of FE readers throughout the country. Watch for announcement of the first 1957 winner in our coming issue.

B.F.Goodrich report:



Floors used to be littered with broken glass

B. F. Goodrich improvements in rubber brought extra savings

Problem: Bottle cases riding down that conveyor from second floor to first would slip, slide, crash into each other. Rubber belts with special rough surfaces were used. But even these were soon rubbed smooth by the wooden cases. Then the belt lost its gripping power—more collisions, more breakage, more mess to clean up.

What was done: When a B.F.Goodrich distributor heard about the problem, he suggested Ribflex—an improved package-handling belt, developed by B.F.Goodrich. It's made with parallel ribs of rubber, cross cut into thousands of soft, flexible grip blocks that can bend just enough to grip what's being carried by the belt, and so hold it firmly, even on steep inclines.

Savings: Now when a case hits the Ribflex belt, it stops a moment and then rides on down—smoothly, safely, with no smash-ups, no broken bottles.

Extra benefits: Because of the flexing rib design, this B.F.Goodrich belt maintains its effective gripping action long after rough-surface belts become worn and ineffective. After 3 years and 7 million cases, the B.F.Goodrich belt shown here has outlasted other belts 3 to 1, and looks good for years more service.

Where to buy: Your B.F.Goodrich distributor has exact specifications on the belt that solved the problem in this bottling plant. And, as a factory-trained specialist in rubber products, he *can* answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-878, Akron, 18, O.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

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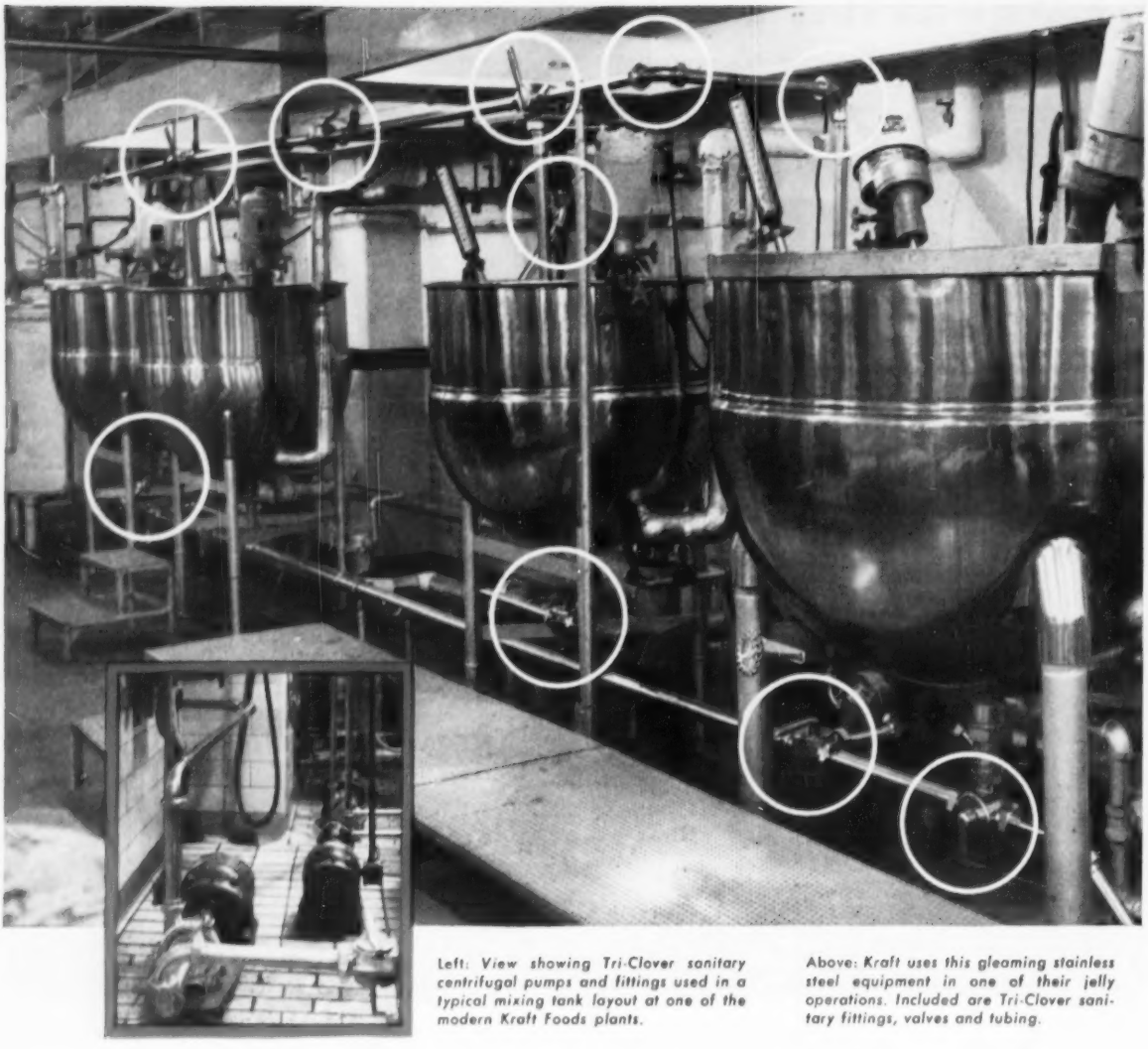

Left: *View showing Tri-Clover sanitary centrifugal pumps and fittings used in a typical mixing tank layout at one of the modern Kraft Foods plants.*

Above: *Kraft uses this gleaming stainless steel equipment in one of their jelly operations. Included are Tri-Clover sanitary fittings, valves and tubing.*

TRI-CLOVER PUMPS AND FITTINGS

help maintain high sanitary standards for KRAFT FOODS

Kraft Foods Company has earned an enviable reputation for constantly high product purity and extremely high standards of sanitation in their many food processing operations.

To help maintain these high sanitary standards and to guard against product contamination, Kraft plants utilize many of Tri-Clover Division's sparkling clean stainless steel sanitary fittings, valves, pumps and tubing. For Kraft has found that Tri-Clover products embody highest quality materials and workmanship and have long met the most strict sanitary code requirements.

Why not let Tri-Clover fittings and pumps help to achieve new standards of efficiency and sanitation in *your* processing operations? Let our engineering staff help in solving your specific corrosion-resistant liquid conveying line problems. *Write for further information.*

5556

See your nearest TRI-CLOVER Distributor

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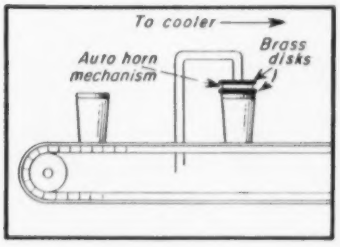
valve B and open valve A. This method has saved us time and made the job an easy one.—*C. C. Davis, Plant Superintendent, Dixie Ice Cream Co., Inc., Lexington, Ky.*



"Cocked" Cap Detector

Ever since converting our preserve and jelly line to screw-off caps we've had the problem of "cocked" caps.

Our standard "press-on" method had been almost perfect in this respect, but the new capping procedure was resulting in a high percentage of imperfectly sealed containers.

Adding a second inspector at the labeler helped. But visual inspection was not enough to catch all the defective jars. Ones that passed inspection were susceptible to spoilage on the grocery shelves. We then realized that an automatic detection system was needed.

Using inexpensive parts, we devised an alarm system and bracketed it to the discharge end of the capping machine (see sketch). We installed an old automobile horn between two brass disks. Then we fixed the disks to the bracket so that they were suspended above the discharge and were level with the conveyor. The lower disk is set so that it is barely above a perfectly capped jar. By adjusting the bracket we can detect imperfect caps on any size jar.

Current for the horn is supplied from a transformer mounted on a nearby post, with in-series hookup.

Clearance between the two disks is the most important factor to be controlled. The difference between a perfect and a cocked cap is often quite small, thereby necessitating a very close tolerance. The ordinary car horn must be calibrated to this tolerance before installing it between the disks.

When a jar with a cocked cap passes under the disks, the lower one makes contact by the same principle as pressing on a car horn. The filling

PENNSYLVANIA PLANT LOCATION DATA SERVICE

Special reports and tabulations, tailored to stated location requirements, will be prepared upon request by our engineering and economics staff from central data, files and direct sources, covering:

LABOR—Availability, skills, rates, surplus areas.

MARKETS—Consumer, industrial product, state, regional.

TRANSPORTATION—Water, rail, truck, air transit time, costs.

FINANCING—Community-state industrial building program, lease-purchase, commercial credit.

BUILDINGS—Availability, sizes, location, descriptions.

SITES—Acreage, topography, utility services, photos, maps, industrial districts.

MATERIALS—Metals, industrial chemicals, wood, textiles, farm products.

MINERALS—Location, reserves, potentials, analyses.

WATER—Quantitative, qualitative analyses.

POWER—Capacity, network, industrial service, costs.

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Industrial Representatives Available For Inspection Tours, Conferences And Consultations

For free copy of "Plant Location Services" pamphlet, or for more details on 100% financing, write or call:

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Hoerner Boxes, Inc.
has been keeping company
with Harding Glass
for *20 years . . .*

It's very clear to the Harding Glass Company — Hoerner's ingenious engineering with sturdy corrugated board creates the best and most economical shipping containers for their handle-with-care products.

It's easy to see through the purpose of this ad. We will help solve your shipping problems just as well. One conference with a Hoerner Packaging Engineer will convince you.

Phone or write the office or plant nearest you.

HOERNER BOXES, INC.

GENERAL OFFICES—600 Morgan St., Keokuk, Iowa • **PLANTS**—Keokuk, Des Moines and Ottumwa, Iowa Sand Springs, Oklahoma • Minneapolis, Minnesota • Fort Worth, Texas • Sioux Falls, South Dakota Fort Smith and Little Rock, Arkansas • Cajas y Empaques Impermeables, S. A., Mexico City D.F., Mexico

department attendant, hearing the signal, comes over and removes the improperly capped container from the line.—*James Lord, Plant Engineer, Lincoln Foods, Inc., Lawrence, Mass.*

Filtering by Gravity

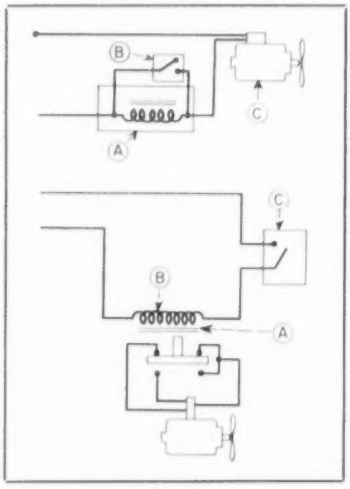
We found a way to improve filtering of fruit percolate in our flavor department.

No longer do we use pumps for this operation—finding gravity works even better.

Our fruit syrups are treated with tannic acid and gelatin to precipitate out the proteins. Then the mixture is pumped to a tank set about 8 ft. above the floor.

From here it is allowed to pass through a Seitz 16 in. square filter press (Republic Filter Corp.) by gravity. This assures a uniform, non-excessive pressure and prevents clogging.

The asbestos sheets in our filter work by the screening action of millions of tiny pores, and by particles adhering due to electrostatic attraction. In order to do it's job properly the pressure should be low and even over the filter. A percolate flow rate of 60 gph. has been satisfactory.—*Dr. S. S. Epstein, Chief Chemist, Kirsch Beverage Co., Brooklyn.*



Ups Dough-Retarder Cooling

In many bakeries the refrigeration system can be improved to handle the great heat load on the dough retarder immediately after loading—

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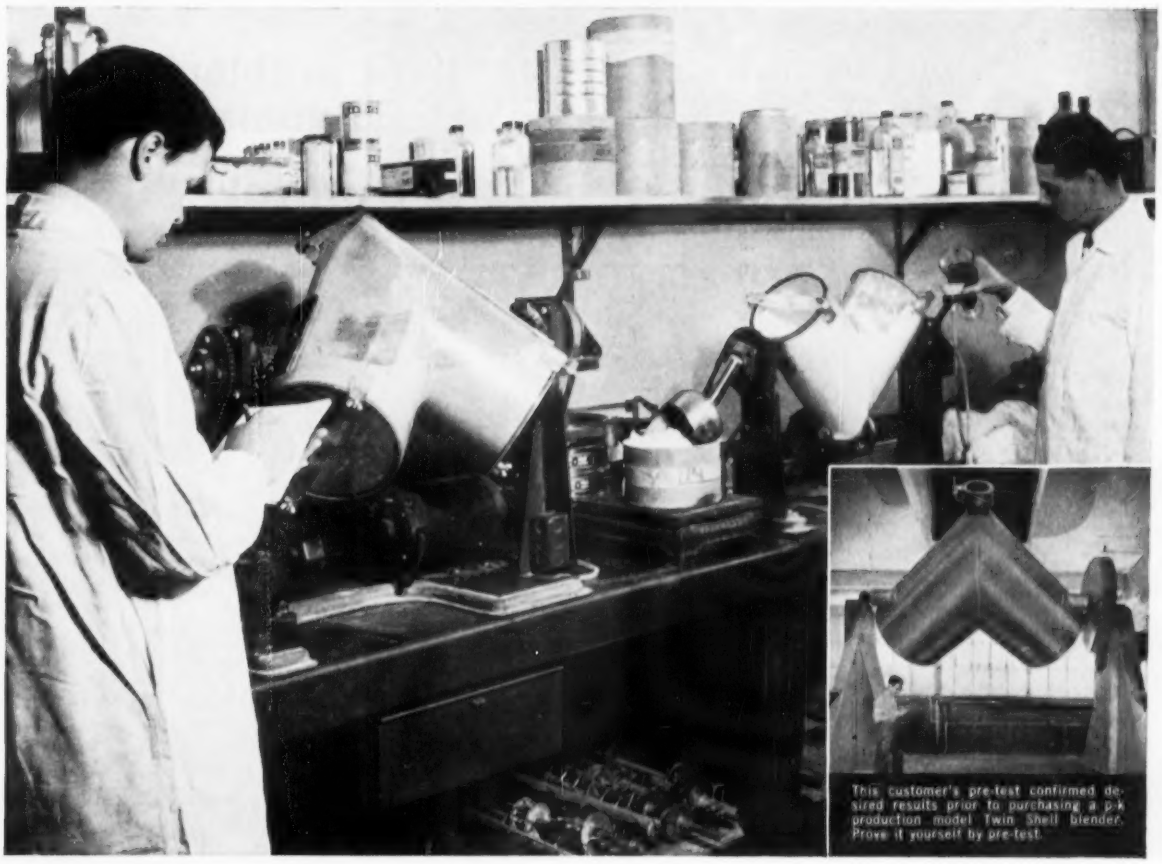

This customer's pre-test confirmed desired results prior to purchasing a p-k production model Twin Shell blender. Prove it yourself by pre-test.

Pre-Tests "Guarantee" Performance of P-K Twin Shell Blenders*

There's never a question as to whether a p-k Twin Shell Blender will do the job. For p-k's "pre-test" service, described at right, removes all guesswork and *proves* that a p-k blender will give you the results you need . . . whether it be a standard model Twin Shell for gentle mixing action, an "Intensifier"* model for difficult-to-blend materials, or p-k's new "Liquid-Solids"* blender, designed for blending liquids into dry materials.

Actually this blending pre-test of your materials is just an extra safeguard. For p-k's remarkable Twin Shell blenders . . . with their unique blending action . . . probably have *already* proved their effectiveness on a job like yours.

Take a look at the V-shape of the shell. In every revolution there's a 5-way tumbling and mixing action *that you can't duplicate in any other blender.* Blending is fast, thorough, and results are consistently uniform.

Add to this the fact that clinical cleaning is a snap in the smooth, baffle-free, interior . . . that loading and discharge is simplified through the ample openings . . . that maintenance is negligible . . . and that blending results obtained with any p-k lab model (from 1 pint working capacity up to 8 quarts) scale-up to production sizes.

*Patented and Patents Pending

Investigate P-K's Blending Concept

P-K's Customer Service Laboratory will be pleased to test-blend your materials . . . preferably under your supervision. Material formulations will be blended to your exact specifications and returned for analysis, together with a complete report. P-K recommends pre-tests for all "Liquid-Solids" applications, because of the many variables that may effect blending procedures necessary for intimate dispersion of liquids in solids. Our Lab also conducts comparison tests in pilot models of all other basic blender types . . . from ribbon and double cone to p-k's standard Twin Shell and "Intensifier" models.

All of them are members of a growing family of p-k blenders and all are described in our new catalog 14. Write our Mr. R. T. Dotter for your copy . . . and arrange, too, for a pre-test of your materials.

The Patterson-Kelley Co., Inc., 1530 Hanson St., E. Stroudsburg, Penn.

Patterson-Kelley
Chemical and Process Division

P-K Twin Shell Blenders* • Heat Exchangers • Packaged Pilot Plants • P-K Lever-Lock Doors*

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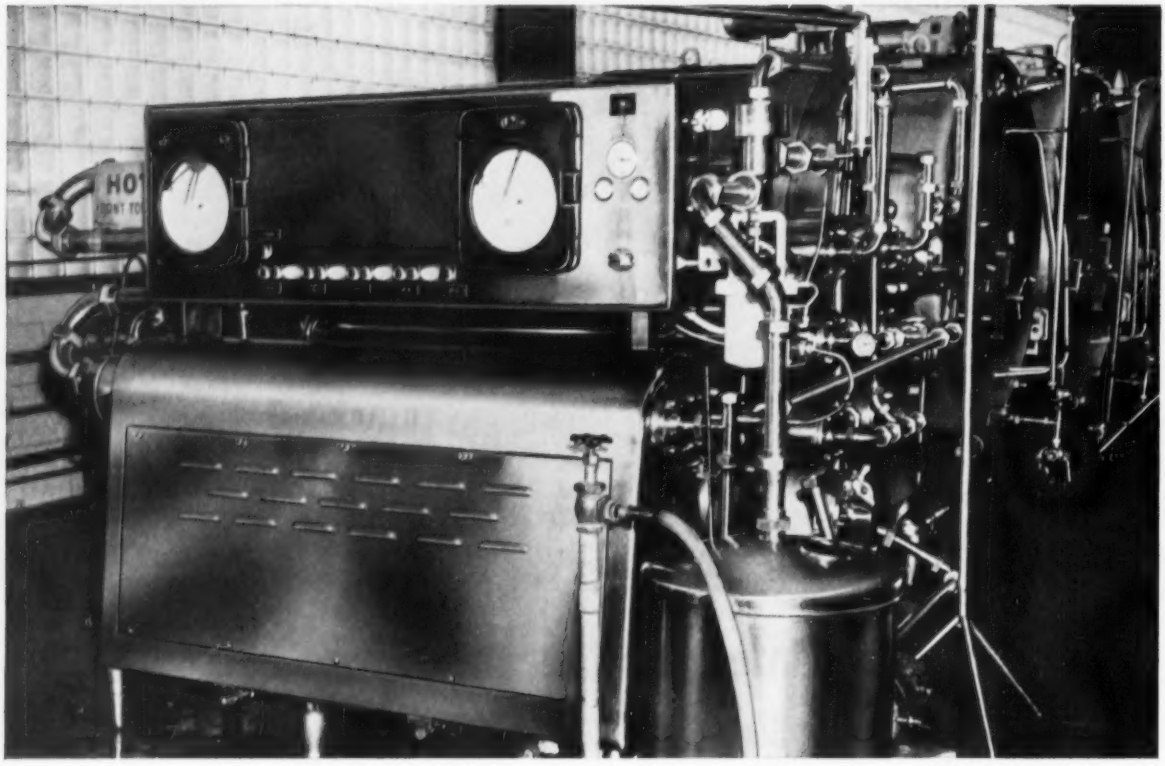
Ultra-critical temperature problem solved by Chicago Stainless Equipment Corp.

. . . with Foxboro Control



◆ Two-tube Roswell Pasteurizer and regenerating sections in use at Luick Ice Cream Company, Milwaukee, Wisconsin. Accurate pasteurizing temperature is continuously maintained by the Foxboro Controllers on panel.

Designed to operate at even higher temperatures and with shorter holding periods than previous pasteurizers, the Roswell Pasteurizer manufactured by Chicago Stainless Equipment Corporation presented an exacting problem of temperature control. Unusual sensitivity, accuracy and adjustability *all* were essential to successful performance.

Based on past experience, this manufacturer selected Foxboro Control, and called in Foxboro Engineers to cooperate in developing the control system. Results proved that this system can be adjusted for any product requirement to maintain temperature automatically and dependably within ½ of 1°F!

This is typical of the better solutions to temperature, pressure and flow control problems now being obtained by builders of many types of food processing equipment through use of Foxboro Instrumentation. Write for our suggestions, outlining your special problems. **The Foxboro Company, 303 Neponset Ave., Foxboro, Mass., U.S.A.**

TYPICAL USERS OF FOXBORO-CONTROLLED ROSWELL PASTEURIZERS

Breyer Ice Cream Co.,
Philadelphia, Penn. — 5 Roswell units

The Borden Co.,
New York — 2 units

Wyeth Laboratories,
Mason, Mich.

Wyeth International,
Bogota, Colombia, S.A.

Penn Dairies,
Lancaster, Penn.

H. E. Koontz Creamery Co.,
Baltimore, Md.

Pure Milk Assn.,
Kansasville, Wis. — 2 units

Braum Ice Cream Co.,
Emporia, Kansas

FACTORIES IN THE UNITED STATES, CANADA, AND ENGLAND

FOXBORO REG. U.S. PAT OFF.

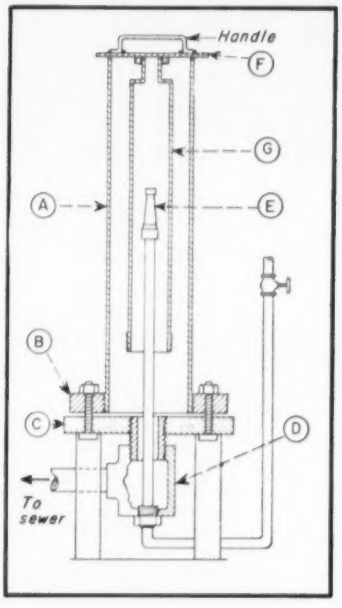
INSTRUMENTATION FOR THE FOOD INDUSTRY

especially since it is very important to lower the dough temperature as quickly as possible.

By increasing fan and motor size on blower type cooling coils you can usually increase both coil and compressor capacity to gain the added cooling needed. And a temperature control set to cut in at 4 to 6 deg. above normal retarder temperature will increase motor speed when necessary. It will also slow the fan when normal temperature is reached, maintaining normal temperature and humidity in the retarder.

On phase wound motors an impedance coil (A in top diagram) is connected in series to operate the fan at normal cfm. With increasing temperature the control (B) cuts out the impedance coil, speeding up the motor (C).

On larger two-speed motors a relay (A in above diagram) has to be used to change speeds. Holding coil (B) of relay—that is normally closed on low speed contacts—closes high speed contacts when temperature control (C) cuts in.—*La Verne Greene, Owner, Greene's Refrigeration Service, Rapid City, S. D.*



Centrifuge Bowl Washer

Washing our Sharples centrifuge bowl (used for cocoa butter) was a time-consuming chore till I made up a special washer for it.

The housing is a length of 6-in. pipe (A) in sketch with a flange (B),

A look into the versatile abilities of Takamine Enzymes will help in the final analysis of your products at the market-place.

If you are plagued with processing or stability problems involving starches, pectins, proteins, glucose (browning reaction) or oxidative changes, Takamine Enzymes will speed operations, control viscosity, enhance flavor and taste and improve storage stability.

Takamine Enzymes serve you in *two ways* — they promote smooth processing operations *and* give your product a *selling personality.*

Send for our complete technical bulletins regarding your product or problem. Please address inquiries to our Technical Service Department.

Takamine Enzymes make it taste better, look better, sell better

DIASTASES
for liquefaction and hydrolysis of starch to produce soluble dextrins and sugars—also, to remove starch causing filtration problems and turbidity.

GLUCOSE-OXIDASE
to prevent browning due to glucose or oxygen and to increase shelf-life of food and beverage products.

PROTEINASES
for the modification and hydrolysis of proteins in food manufacturing and pharmaceutical operations.

PECTIC ENZYMES
for the hydrolysis of pectins in fruit and fruit juices to speed processing and to make fruit juices sparkling clear for consumer appeal.

TAKAMINE

TAKAMINE LABORATORY
DIVISION OF MILES LABORATORIES, INC.
CLIFTON • NEW JERSEY

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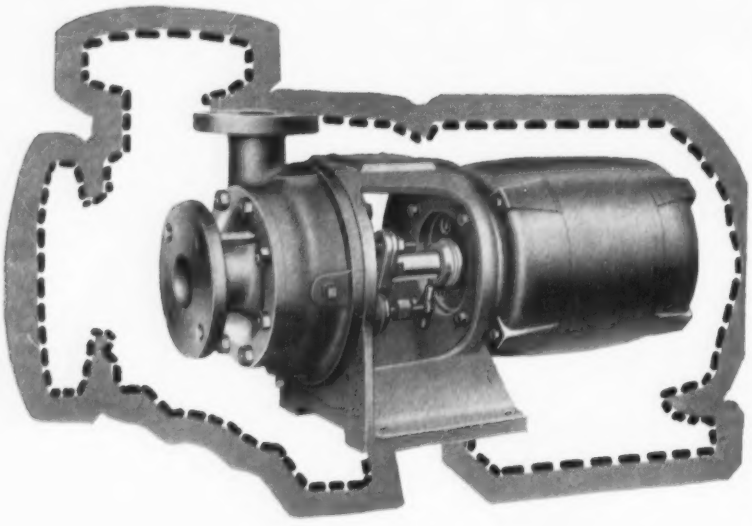
You can cut pumping costs



by doing the job with a smaller Ingersoll-Rand

MOTORPUMP

By reducing original cost. Many plant operators say yes, because liquid handling operations can generally be done by I-R Motorpumps of lower horsepower than other pumps.

By saving on weight and space. Both, probably—because Motorpumps are so compact and efficiently designed.

By lowering power consumption. Definitely—many Motorpump users get substantial savings in power over pumps previously used.

By simplifying installation. That's certain—because Motorpumps can be mounted in *any* position . . . on floor, wall or equipment . . . without the need for any special foundations!

You'll find other big I-R advantages in the latest Motorpump catalog. Send for your copy now.

Ingersoll-Rand

9-365 11 Broadway, New York 4, N. Y.

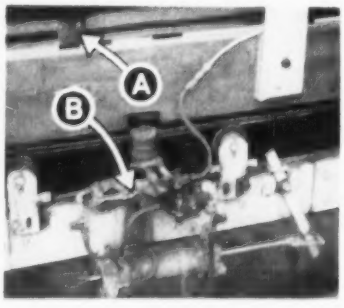
Practical Ideas

fastened with bolts to a blank (C) with a 2-in. opening. Joined to this is a 2-in. tee (D), with one opening draining to the sewer.

Third opening of tee has a ½-in. coupling brazed in a reducing bushing. A hot wash-water line runs through the coupling to a length of pipe terminating in an ordinary garden hose nozzle (E).

The bowl is supported by a thread protector mounted on cover plate (F). Cemented to the plate is a gasket that seals the top by the weight of bowl (G).

For clean-up, bulk of the solids is removed with a cleaning scoop. Then the bowl is put in the washer to remove the harder residue—instead of hand-washing with a bowl brush in a sink.—*George Williams, Robert A. Johnston Co., Hillside, N. J.*



Stops Side-Drift of Belt

Our plant handles up to 1,400 tons of oranges per day. Distributing this amount of raw material to various processes requires numerous belt conveyors.

At many points, belts must be loaded from adjacent bins. And some belts are unloaded by "plowing" the fruit off the belt, to one side.

These operations, coupled with "just plain cussedness" on the part of our chlorine-water-sprayed units, caused belts to side-drift. And frequently this had the belts dragging against the side members of conveyor structures.

This led to many ruined belt edges, in spite of almost constant realigning by maintenance crews. Unfortunately, these corrections were nullified every hour or so, as loading or unloading points were varied.

Ultimately we developed a design to end this problem.

We realized that the best known way to "train" a belt sideways is to change the angle between the axis

Pure Food Company's Plant Manager, ***Edwin C. Meyer,*** *tells how—*

"Armorply let us use our back yard for freezer space"

Firm impressed by Armorply's low cost and flexibility

Q. What problem led you to install your Armorply freezer box?

A. That happiest of all problems . . . our business was increasing so much we needed more storage space.

Q. What is Pure Food Company's business?

A. We buy dressed chickens from packers, cook them, and can them under our label—Westchester Brand—and under some private labels. Half our line consists of soups, and the rest is various chicken dishes and bouillon cubes.

Q. What is the freezer box's part in your operation?

A. Our production line begins and ends with the chicken, so it's absolutely essential that we have adequate supplies on hand. The freezer box must keep the chickens fresh-frozen economically. And here the Armorply box works better than any other I've ever seen! And we're very fussy about the chances of any chickens spoiling.

Q. At what temperature do you keep your Armorply freezer box?

A. About 22°F. But if we get a load of chickens that have just been packed in ice, we drop the temperature to 0°F., and quick-freeze the chickens in about half an hour.

Q. How big is your Armorply freezer box?

A. About 24′ by 30′ by 11′5″ high. In all, 5500 cubic feet. That's a capacity of two trailer-truck loads of chicken — approximately 27 tons. And we've put it outside the plant, so it was extra-easy to install and didn't take any valuable space.

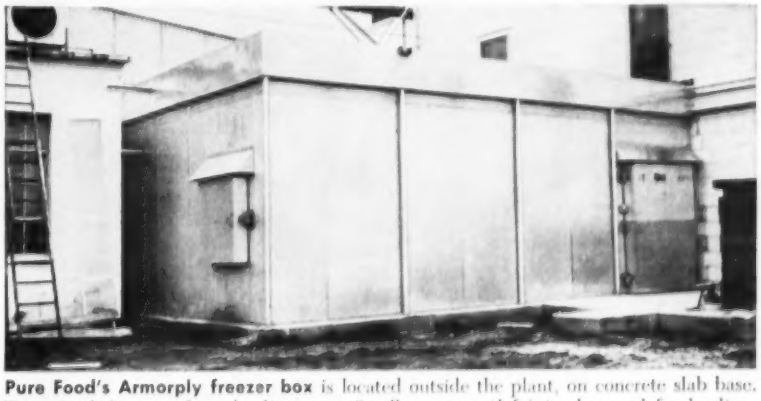
Q. Where did you buy your Armorply freezer box?

A. From Freezer Box Division, Annapolis Yacht Yard, Inc., Annapolis, Maryland. They showed us that with its modular panel construction, the box could easily be erected . . . and then later altered in shape or even moved completely! We can add on more modules if we want to expand it. And the cost was comparable to ordinary plaster-and-insulation units!

Q. What recommendations could you make to others based on your experience with the Armorply freezer box?

A. We like it very much. We got the storage space we needed in the shortest possible time. It is very efficient, cools quickly and economically and requires little — if any — maintenance. It was easy to design and install. The best testimonial I can offer is that if and when we get another freezer box—which we hope is real soon—we'll get one just like the Armorply we now have.

Armorply is waterproof plywood with a metal face permanently bonded on either or both sides. Metals include steel, stainless steel, monel, aluminum, lead, copper and others. Armorply panels are light in weight, verminproof and impervious to moisture, remarkably strong and very easy to fabricate. Armorply also finds wide use for metal-faced doors in high traffic areas, counterfronts, countertops, and packaging table tops. Send the coupon for details and a free sample of Armorply.



Pure Food's Armorply freezer box is located outside the plant, on concrete slab base. Door (right) opens from loading area. Small pass-out (left) is also used for loading. Water is poured on roof in summer to keep temperatures down economically. Manufactured by Freezer Box Division, Annapolis Yacht Yards, Inc., Annapolis, Md.

Weldwood® Armorply® METAL-CLAD PLYWOOD

A product of

UNITED STATES PLYWOOD CORPORATION

Weldwood—The Best Known Name in Plywood

United States Plywood Corporation
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FREE: Please send me free sample of Armorply and descriptive literature.
☐ Have your representative call with full details.

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COMPANY .....

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CITY ..... STATE .....

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To help sell the foods you package in Canco containers . . .

. . . Canco sponsors NBC NEWS on TV during 1957

— broadening the famous "oval" campaign to consumers!

This year, news-conscious America is seeing Canco's oval trade-mark on television—and learning why it symbolizes packaging leadership . . . how it helps everyone to "live better, more conveniently, for less money."

To tell its message, Canco has chosen NBC NEWS on TV, featuring Chet Huntley and David Brinkley. It is TV's *highest-rated* news show, carried by 89 stations with a potential audience of 35 million TV homes!

To get the full benefit of this powerful and dramatic campaign, make certain *your* containers carry the Canco oval—the trade-mark recognized by more and more consumers as their guide to quality containers.

Tune in the next Canco NBC-TV NEWS Show—March 11, and alternate Mondays thereafter. See your local newspaper for time and channel.

AMERICAN CAN COMPANY *New York • Chicago • San Francisco*

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of the carrier rollers and the path of belt travel.

We believed that we could mechanically "slew" a whole group of rolls, when required, to provide a greater concentration of corrective force to the displaced belt. A group of six consecutive rolls was chosen, and the hangers on one end of each were loosened from the conveyor frame. The six hangers were welded to an angle iron resting on the conveyor frame so that when the angle was moved lengthwise, all six rolls were slewed toward or away from the direction of belt travel.

First trials, by hand, showed great promise, so we proceeded with automation of the affair.

We passed a flat bar crossways under the belt, and mounted rollers on vertical pins above the bar, almost in contact with the two edges of the belt—(A) in photo. The bar was mounted so that it was free to move endways when the belt contacted one or the other of the vertical feeder rolls.

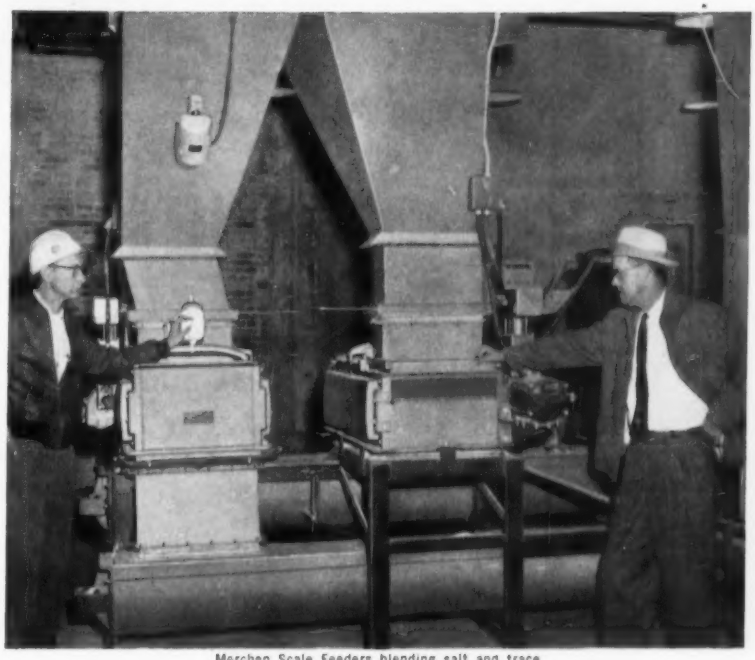
Beneath one end of the bar, we mounted a flat, vertical blade—(B) in photo—with provision to vary the angle of its surface with the line of thrust of the flat bar. This blade rested between the rollers of two roller lever-operated 3-way air valves so that, when forced against either valve roller, air was delivered to the appropriate end of a small double-acting air cylinder.

Through linkage, the air cylinder moves the angle iron carrying the ends of the six belt idlers in the proper direction to provide corrective force to the belt.

To prevent excessive corrective action at the belt, the two air valves are mounted on a plate attached to the long angle, and ride along with the angle and belt idlers. Accordingly, when blade touches one valve, there is a small amount of corrective action, which also moves the valve out of contact with the blade, stopping the action. If the belt continues to creep, further short spurts of corrective movement occur until equilibrium is reached, with the belt still within its permissible path.

Any tendency of the belt to correct itself too far is covered by the blade contacting the other air valve for tiny adjustments in the opposite direction.

Having proved successful, this system has been placed at required points on a number of our belts. Each installation is furnished with air through a ¼ in. aluminum tube, from the main plant system. Once



Merchen Scale Feeders blending salt and trace minerals at Carey Salt Co., Hutchinson, Kansas.

MERCHEN SCALE FEEDERS

offer continuous dry blending by weight

The Carey Salt Company produces salt blocks for cattle that contain a percent blend by weight of nutritional minerals. W&T Merchen Scale Feeders were selected for the blending operation.

If accurate blending of dry, free flowing materials is important to your production, Merchen Scale Feeders offer feed rates from 3 ounces to 3000 pounds per minute, always maintaining accuracy within 1% of the feed rate. The feeders compensate for changes in material density to maintain a constant feed by weight.

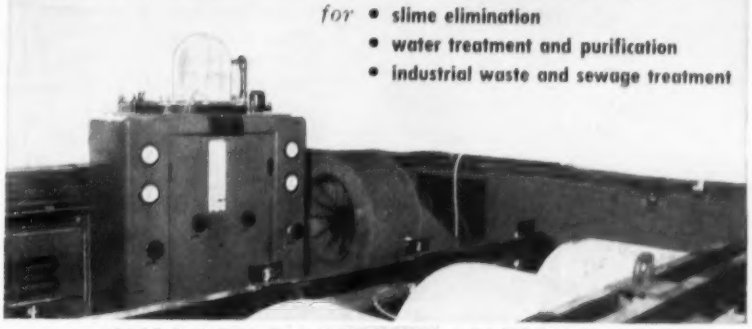
Where a number of ingredients must be blended, Merchen Feeders can be electrically or pneumatically controlled from other plant equipment for automatic operation. Send for our free booklet M-33, "The Best Weigh is the Merchen Way."

WALLACE & TIERNAN INCORPORATED

25 MAIN STREET, BELLEVILLE 9, NEW JERSEY

CHLORINATORS and CHEMICAL FEEDERS

for
- slime elimination
- water treatment and purification
- industrial waste and sewage treatment



WALLACE & TIERNAN INCORPORATED

CD-41 25 MAIN STREET, BELLEVILLE 9, NEW JERSEY

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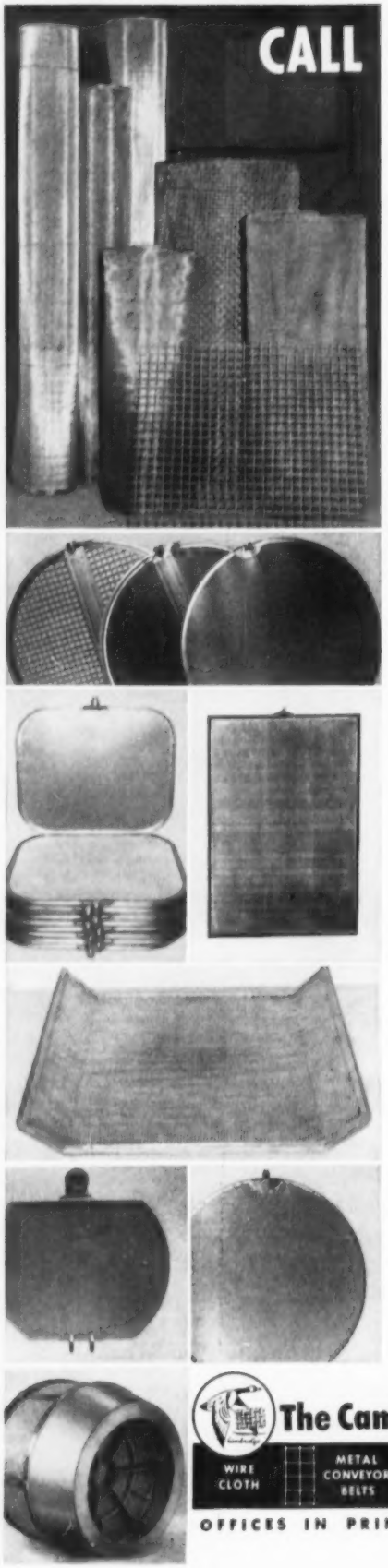


Cambridge
for
INDUSTRIAL
WIRE CLOTH

in BULK
or
FABRICATED PARTS

COMPLETE LINE

Nine weaves ranging from the finest to the coarsest, in any metal or alloy.

ACCURATELY WOVEN

Individual loom operation and careful inspection just before shipment assure accurate mesh count and uniform mesh size.

PROMPTLY DELIVERED

Most bulk orders are shipped immediately from stock. If your needs are for less frequently used types, we'll schedule our looms to fill your order without delay.

In fabricating parts . . . filter leaves, strainers, sizing screens . . . we'll work from your prints or draw up prints for your OK.

LET US QUOTE on your next order for wire cloth. Call your Cambridge Field Engineer—he's listed under "Wire Cloth" in the Yellow Pages of your 'phone book or write for FREE 80-PAGE CATALOG and stock list.

The Cambridge Wire Cloth Co.

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

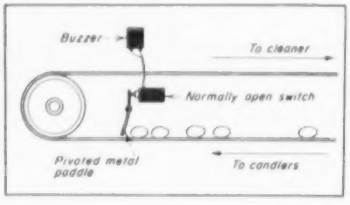
Department Q, Cambridge 3, Maryland

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

Practical Ideas

in operation and adjusted, almost no further attention is required. The units don't require any turning on or off, and use no air when belts are not in use. They just automatically act at any time the need arises.

Best of all, we have had no further belt-edge wear. (Some portions of this invention are now patented).—*John H. Nicholson, Project Engineer, The Exchange Orange Products Co., Ontario, Calif.*



Safely Uses Lower Belt For Return Conveyor

We employ a conveyor system which, for our purposes, is efficient and satisfactory. However, it was first necessary to introduce a safety factor, through the addition of a normally opened Microswitch control, and operative device.

Incoming eggs are carried on the top belt of the conveyor to the cleaner, after which the eggs are returned to the candlers on the lower run of the same belt.

Obviously, if eggs are not removed before they reach the end of the lower belt, they pile up between belt and pulley and many of them smash on the belt. In this event the whole line must stop while the belt is cleaned. Both time and eggs were thus lost.

This condition is now avoided by extending across the lower belt a sheet metal paddle suspended across the conveyor and so located that pressure against the paddle below the pivot rod will actuate the normally open Microswitch through the portion of the plate above the pivot point. When the circuit is closed a loud buzzer is sounded to warn the nearest candler to stop the conveyor or remove the eggs pressing against the control paddle. This latter device is so sensitive that the pressure of not more than three eggs against the paddle will actuate the switch.

Product loss has been reduced, down time avoided and plant sanitation improved.—*Paul Harvey, Owner, Deshler Egg Co., Deshler, Neb.*

Announcing! NEW REASONS WHY CHEVY'S BEST IF YOUR JOB IS BIG!

New higher G.V.W.'s, new cast-spoke wheels, new full-air brakes, new bigger tire sizes in Chevrolet Task-Force Trucks!

G.V.W.'s increased as much as 4000 lbs. for bigger loads, bigger profits! Chevrolet's mighty Triple-Torque Tandem is more than ever the industry's load-hauling champ—with G.V.W. hiked from a high 32,000 lbs. to a whopping 36,000 lbs.! In Series 5000H and 6000H models, G.V.W.'s have been advanced 1500 lbs. (to 21,000 lbs.) and in Series 7000 and 8000 models G.V.W.'s are now up 1000 lbs. (to 22,000 lbs.)!

*New cast-spoke wheels** are available on Chevrolet Series 9000 and 10000 trucks. These payload boosters are strong yet light, widely interchangeable, easy to service.

*New full-air brakes.** Safe straight-line stops with heavy loads are assured by these rugged brakes, now provided on Series 9000-10000 models.

*New bigger tire sizes.** New 11-22.5 tubeless tires, front and rear, or 10.00-20 tubed tires, are added assurance that 1957 Series 9000 and 10000 Chevrolet trucks are built from the ground up to haul your biggest load with ease!

For all the news about sky-high payloads and profits, see your Chevy dealer. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

**Optional, extra cost.*

NEW CHEVY L.C.F. MODELS ARE SPECIALLY DESIGNED FOR MAXIMUM LOADS, EASY MANEUVERING AND SERVICING

1. *Compact length* of the L.C.F. tractor (89¼ inches, bumper to back of cab) enables you to pull a long 35-foot trailer while holding overall truck length to less than 45 feet.
2. *Low height* of L.C.F. cab means that the distance from the ground to the cab floor is shorter; entering or leaving is more convenient.
3. *Short wheelbase* makes Chevy L.C.F.'s *maneuverable* trucks easy to wheel in and out of tight spots.
4. *Good weight distribution*—more *truck* weight on the front axle means that extra *load* weight can be placed on the rear axle.
5. *Easy servicing* is an added L.C.F. advantage; all engine components are quickly accessible.

PROVED ON THE ALCAN HIGHWAY... CHAMPS OF EVERY WEIGHT CLASS!

TASK·FORCE 57 CHEVROLET TRUCKS

CHEVROLET

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STOP COOKING *pie fillings!*

NEW **STABILIZER 37** is a cold swelling starch for fruit and soft type pie fillings. Eliminates cooking and cooling. Also saves labor, time, fuel. Requires no special equipment.

NEW **STABILIZER 37** offers everything:

· Exceptional clarity · Sparkling color · Smooth creamy texture
· Improved fruit appearance · Cooked starch body

NEW **STABILIZER 37** is simple to use. Moreover, it can eliminate cooking many frozen foods. Write for a sample, more information and suggested formulas.

NOW AVAILABLE FROM YOUR BAKERY SUPPLY HOUSE.

National
STARCH PRODUCTS INC.

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it pays to take a

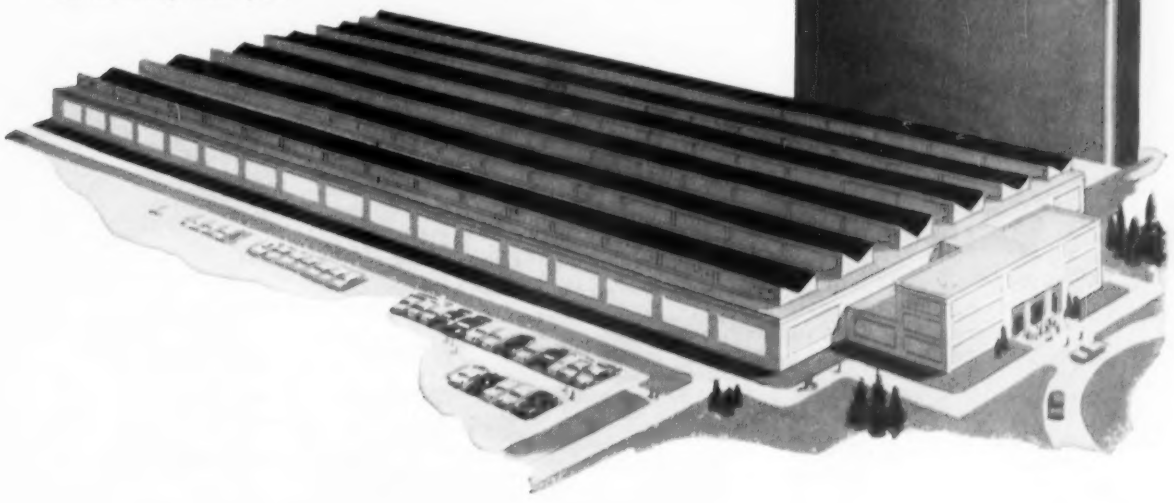
Plant-Wide Look at weighing!

which do you have... isolated scales... or a modern weighing system to control your costs?

All industry is under pressure . . . to reduce costs . . . raise efficiency. And managements today see *weighing* in a new perspective—not as isolated scales, but as a vital element in the overall cost-control system. This means the right scales in the right places . . . to supply basic accounting records of materials received, processed, shipped, transferred.

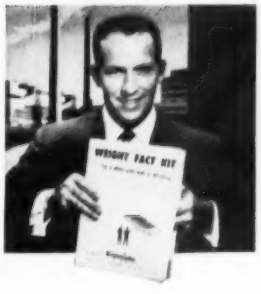
Weight records directly affect costs, inventory control and customer billings. Weights must be right the *first* time. Whether discovered or not, weighing errors can lead to losses in profits and customer good-will.

To assist you with your "weight control" problems, Toledo offers the choice of a complete line of models, plus the experience and services of factory-trained representatives conveniently near you.



NEW TOLEDO WEIGHT FACT KIT...
Shows you the job your scales are now doing! This new Toledo Weight Fact Kit will help you determine how well your scales measure up as a *weighing system*—show you if any scales are "misfits" in capacity, application or location—help you detect weighing inefficiencies that drain off profits.

It's free—no obligation! So be sure to request yours. Address Toledo Scale Co., 1404 Telegraph Rd., Toledo 1, O



TOLEDO®
HEADQUARTERS FOR SCALES

SERVICE Factory-Trained 200 Cities

TOLEDO SCALE COMPANY
TOLEDO 1, OHIO

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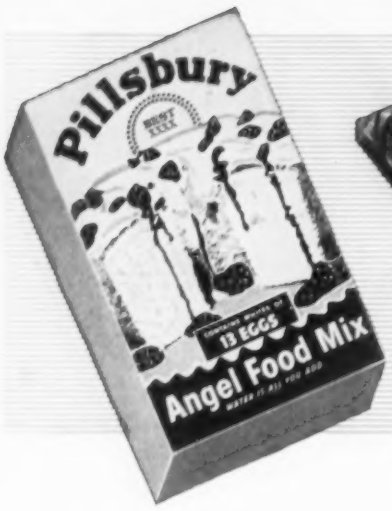

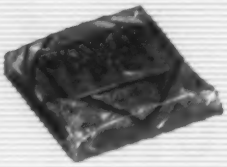

everything you sell
deserves the protection of

WAXED
GLASSINE

Meets every exacting requirement on your packaging check-list!

More Sales Power Per Package

REMEMBER...Waxed Paper is *more* than a wrapper. It billboards your brand, merchandises itself, sells itself. Waxed Paper is an advertisement with genuine appetite appeal. In fact—*it's an appetizement!*

WAXED PAPER MERCHANDISING COUNCIL, INC.

. . . with WAXED GLASSINE

Selection and design of flexible protective packaging solved at minimum cost! Packagers rate Waxed Glassine high in performance, compatability, strength, printing, sealing, stability, permeability . . . and here's why!

THE POWER OF WAXED GLASSINE OUTER WRAPS:*

- **More eye appeal** Sparkling clean surface provides perfect background for brilliant, contrasting colors, makes the most of appetizing illustrations, lets you use entire package for powerful all-over sales-winning designs that prompt purchase by brand! Waxed Glassine comes in many weights, many colors—one just right for the job in mind!
- **Billboards your brand** Every package is a *billboard* in the store and in the home, generating impulse sales and assuring repeat customers with its fresh, inviting look, strong appetite appeal, stand-out brand identification and proven selling features!

INNER AND OUTER WRAPS OF WAXED GLASSINE:

- **Extra flavor protection** Safely seals in all that desirable just-made goodness, keeps customers coming back for more. And satisfied shoppers mean satisfied retailers!
- **Extra freshness protection** Self-sealing Waxed Glassine protects against moisture invasion, maintains freshness and texture best for longer shelf and pantry life. Easier to open, easier to reclose, contents keep fresh and tasty for the life of the package!
- **Extra grease protection** Waxed Glassine wrappers resist penetration by fats, oils, shortenings. No more rancidity problems! Your package stays clean, inviting, colorful!
- **Extra strength** Waxed Glassine passes every rugged test of delivery, in-store and consumer handling! Made stronger to stack better, it cuts down crumbling, breakage, ripped wrappers and returns that shrink your profits!
- **Low cost** Lower basic costs plus constant, dependable supply combine with other Waxed Glassine advantages to produce a package that reaches out and sells! Result: increased *net* profits for you!

Waxed Glassine teams up with the experience, facilities and service of the nation's top converters, to give you modern packaging and product protection that pays off in bigger packaging business—and the job doesn't stop here!

Traffic-stopping *designs*, actual *samples*, proven *sales ideas*, complete *cost sheets* show how Waxed Glassine pays off in better packaging, higher brand profits! See your Waxed Paper salesman, or write or telephone us direct.

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PROTECTS FRESHNESS AND FLAVOR
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ATLAS
"INDIVIDUALLY ENGINEERED"
FURNANE FLOORS

...the only permanent solution!

A mere corrosion-proof floor is not the complete answer to the problem of providing a permanent base for food processing operations.

Sometime ago Atlas realized that in the construction of a successful corrosion-proof food plant floor, more factors must be considered than just the nature of the corrosive products involved—factors such as attractive appearance, temperature variations present, type of cleaning detergents used, possible physical abuse and wet conditions normally encountered.

The Atlas "Individually Engineered" concept takes all these aspects into consideration in offering, for the first time, a truly permanent solution to your flooring problems. Naturally, you also get positive protection against the whole range of corrosives, from the mildest food acids to the strongest cleaning agents.

A Furnane Floor offers lasting beauty, long service, and assured installation techniques, all combined in a custom-installed and "Individually Engineered" flooring to meet your specific requirements.

ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNSYLVANIA

Write today for the booklet, Food Floor Facts, giving complete information. Consult the Yellow Pages for your local representatives.

LETTERS—

Finds Resistance to Use Of Thaw Indicator

Dear Sir:

One of our stockholders recently abstracted your editorial, "Packers Must Act on Frozen Food Problem." I have the copy before me now, and I am interested in the ideas presented [relative to maintaining correct temperatures].

Our St. Eloi Corp. has had, for nearly three years now, a product which we call Thermochromotex. This is a clear liquid which, when frozen, develops a straw yellow color.

If, at any time, the liquid is thawed above a certain critical point, the yellow changes to carmine red.

It is our impression that Thermochromotex is nontoxic and can be made commercially available in plastic packages of the requisite size required for eventual industry utilization. We believe it to be useful as a thaw-out indicator for packages of frozen food.

One of its more interesting properties is that the thaw-out temperature may be altered from as low as —20 deg. C. (—4F.) to approximately the freezing point of water itself.

To put it a different way, the food may be allowed to warm up to a given point, depending upon quality-maintenance principles, without actually indicating thaw.

We have been told over and over again that a thaw indicator is extremely desirable. In just as many instances, we have been told that although it was extremely interesting and performed well, the siuation would not warrant the use of thaw indicators.

This last, of course, is in complete contradiction to your editorial.—*Ronald B. Howes, President, St. Eloi Corp., Newtown, Ohio.*

COMMENT—There is no doubt but that a good temperature-abuse indicator for frozen foods would be a useful tool for improving the maintenance of quality in distribution channels. This was pointed up at the recent National Frozen Foods Convention, at which new objective tests for abuse were presented (FE Feb., p. 125).

It is understandable, however, that there might be some reluctance to employ a thaw indicator in such a way that it would be seen by the consumer, no matter how desirable it might seem from a quality-control viewpoint.—The Editor.

← For more data, circle this page number on card at back

Here's How

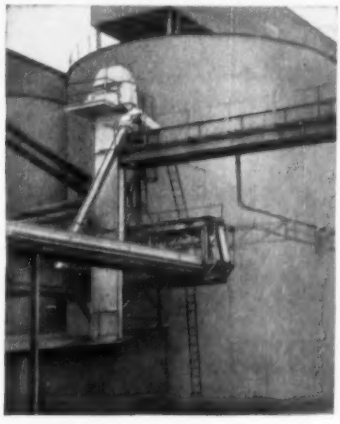
you can lower the cost of elevating

LINK-BELT will recommend the right bucket elevator from a broad range of 13 types

YES, not only does Link-Belt make bucket elevators for all types of material — there is specialization right down to spacing of buckets . . . the types of take-ups and hoods for utmost effectiveness. In addition, Link-Belt offers a wide range of buckets for further assurance of maximum efficiency in handling your materials.

Installation, maintenance and operating costs are low with Link-Belt Bucket Elevators. Rigid, jig-built casings are self-supporting, requiring only occasional lateral tie-ins depending on height. You have quick access to both head and boots for periodic inspections. Simple screw or gravity take-ups maintain chain or belt tension always.

To be sure of a bucket elevator system tailored correctly for your needs, include Link-Belt in the designing of your next plant. Get in touch with a materials handling expert through your nearest Link-Belt office.



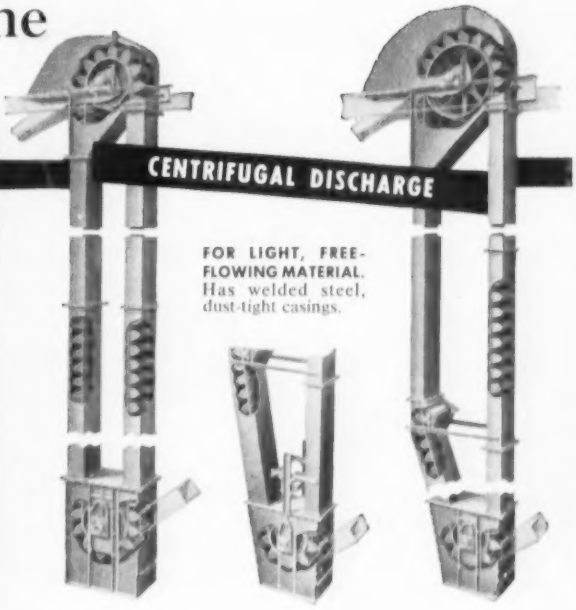
ONE OF SEVERAL Link-Belt bucket elevator and screw conveyor combinations installed at a midwest soy-bean oil mill. Equipment insures smooth flow of beans throughout process.

LINK-BELT

BUCKET ELEVATORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.188

CENTRIFUGAL DISCHARGE



FOR LIGHT, FREE-FLOWING MATERIAL. Has welded steel, dust-tight casings.

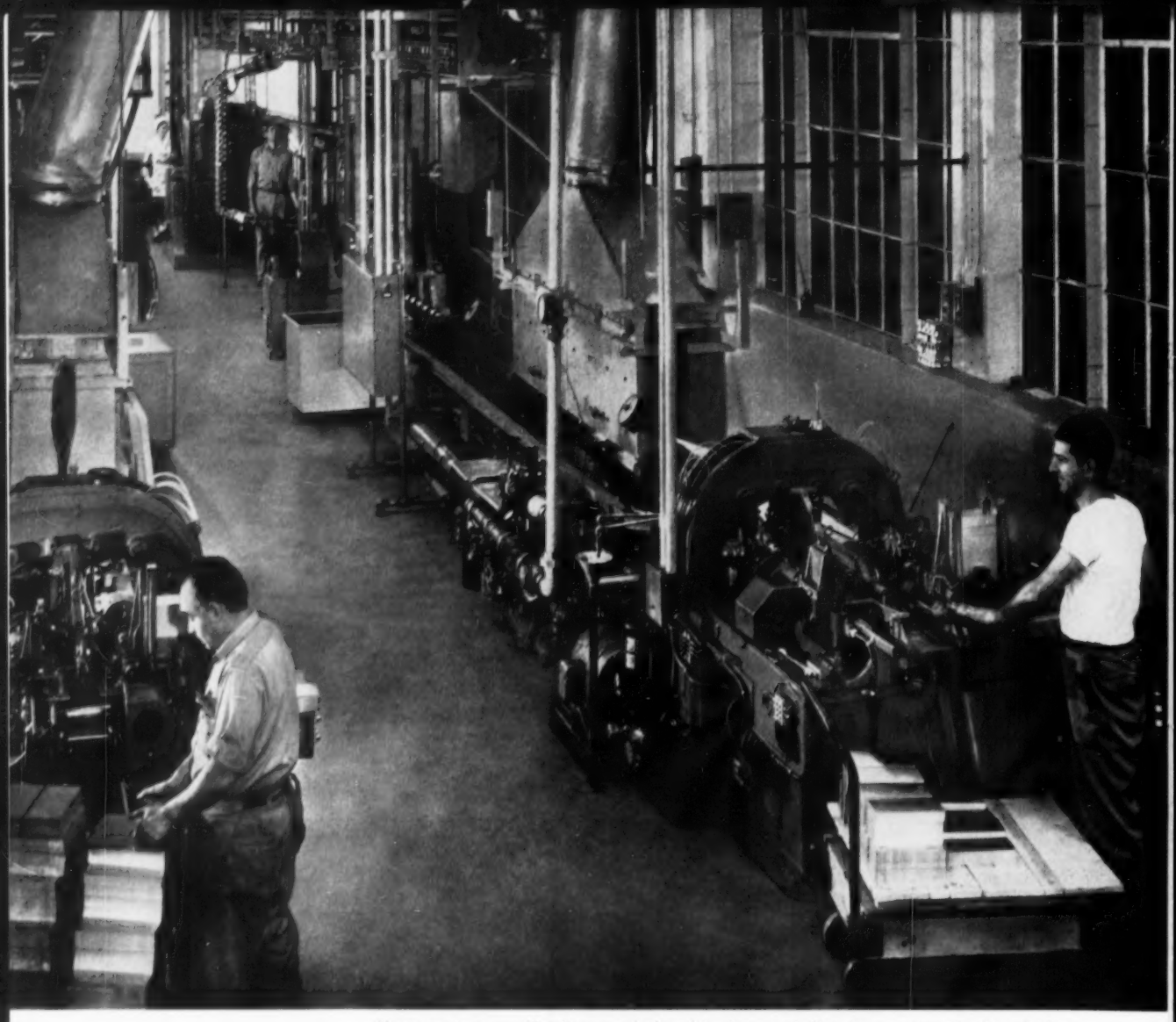
Boot shaft furnished with gravity take-ups on elevators having 50-foot centers or more. Elevators have steel buckets mounted on belt. Curved hood is designed for proper discharge of material.

FOR LIGHT, FRIABLE, SLUGGISH MATERIALS. Buckets are mounted on double chain strands.

POPULAR FOR WIDE RANGE of material. Fixed head shaft, screw type boot shaft take-up.

FOR CRUSHED MATERIALS WITH LUMPS less than ½". Fixed boot shaft, adjustable head shaft.

For more data, circle this page number on card at back →



Above are two new Hamilton can bodymaking lines, including the new 501 Hamilton Bodymaker and Soldering Machine units, recently installed at Hershey Chocolate Corp., Hershey, Pa.

Newly designed can bodymaker cuts down on shutdown time

Hamilton's newly designed No. 501 Bodymaker and Soldering Machine represents the latest development in can making equipment. One of its many features is a central drive shaft, which means less linkage, lower maintenance costs, and shutdown time reduced to a minimum. All crank-actuated motions are from this central drive shaft. Automatic stops are provided throughout as a safety feature if a jam should occur.

This No. 501 Bodymaker is Hamilton's latest development in the world's most complete line of can machinery. Other modern Hamilton bodymakers and related machinery are available to produce all sizes of sanitary and general line cans. Write today for detailed literature on Hamilton Automatic Can Making Machinery. Hamilton Division, B-L-H Corporation, Hamilton, Ohio.

Hamilton Division Hamilton, Ohio

BALDWIN · LIMA · HAMILTON

Diesel engines • Mechanical presses • Can making machinery • Machine tools

BALDWIN BLH LIMA-HAMILTON

"The salt we use does a good job—why change?"

When you can do a better job with another kind of salt, it's worth making a change

. . . And a change to Morton '999' Salt for processed foods will insure better, more uniform flavor. For '999' is a low-price, premium grade salt entirely free from bitter calcium and magnesium compounds that can distort flavor. Morton '999' Salt is always 99.9% clean, pure sodium chloride, exceptionally low in the objectionable trace metals, copper and iron.

Unlike some salt, the quality of '999' never varies from shipment to shipment, whether you buy it in bulk for direct salting or brine, or in handy tablets made to your own specifications.

Morton technical service can help you do a better job, too. A Morton Consulting Engineer will be happy to discuss salt with you. He also can help you with such problems as installing a water softening system, or modernizing or expanding a brine installation. And he's backed by the services of the best equipped salt research center in the world—Morton's multimillion-dollar research laboratory in Woodstock, Illinois. Best of all, there's no charge or obligation for any help you receive through a Morton representative.

Regardless of your size, we think you'll find it well worthwhile to talk about salt and service with a Morton Consulting Engineer. If you agree, just write:

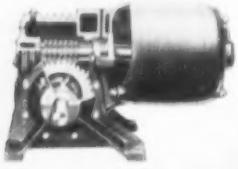
MORTON SALT COMPANY
INDUSTRIAL DIVISION
Dept. FE-3, 120 So. LaSalle Street,
Chicago 3, Illinois

For more data, circle this page number on card at back →

How to dial a pair of pants

MASTER

At the touch of a switch, unit rotates and indexes correct order to delivery position. It's fast, accurate and multiplies floor space efficiency. Power is a ⅓ H.P., 115/230 volt, 60 cycle, 1 phase Master Right Angle Gearmotor.



ANOTHER DRIVE REQUIREMENT MEETS ITS MASTER

You look at a motor application in an ad, and 99 times out of a hundred first thing you say is, "But my problem's different." Here, it's 100 to one you'll be right.

Point is the manufacturers of this fast, efficient and extremely ingenious dry cleaning storing mechanism told Master what they needed. Light, geared-down, steady power, full start, positive stop. And whenever the attendant in a progressive shop so equipped dials your pants, a Master Gearmotor delivers the goods.

And Master can deliver the goods for *you!* Master components can be integrated in any combination to give you the right horsepower, right shaft speed, right mounting features, in a single, efficient compact unit. See Master for your drives!

Motor Ratings	⅛ to 400 H.P. All phases, voltages, frequencies.
Motor Types	Squirrel cage, slip ring, synchronous, repulsion-start induction, capacitor, direct current.
Construction	Open, enclosed, splash-proof, fan-cooled, explosion-proof, special purpose.
Speeds	Single-speed, multi-speed, and variable speed.
Installation	Horizontal and vertical, with or without flanges and other features.
Power Drive Features	Electric brakes (2 types)—5 types of gear reduction up to 432 to 1 ratio. Mechanical and electronic variable speed units—fluid drives—every type of mounting.

MASTER ELECTRIC MOTORS

THE MASTER ELECTRIC COMPANY • Dayton 1, Ohio

Hoosiers Set Pattern for Career Promotion

Every leader in the food field is aware of the critical shortage of technical manpower. Yet woefully little is being done about it.

So it is most encouraging to see the Indiana section of the Institute of Food Technologists go into action. It staged a carefully planned career guidance symposium—with some new twists—on January 12.

Similar action on a country-wide scale is urgently needed, so we believe that everyone should have inside information on the Hoosier affair. This we requested from one who had a big hand in it. Here's what S. J. Davin, of Stange, has to say:

Grassroot Recruiting Action

"For all practical purposes, a grassroot movement to recruit high school students in the field of food technology was brought into action when 65 top-flight Indianapolis students—plus 10 of their guidance directors—attended a meeting of Indiana Food Technologists.

"When I mention a grassroot movement, I mean a campaign of specific and detailed action, such as the arousing of guidance counselors and inducing the cooperation of local newspapers."

"We cultivated the guidance directors' friendship, and made them a part of the program. And I believe that the respect of the students for these directors was the connecting link of a successful meeting.

"The students listened for six hours to—and asked questions of—speakers like George Garnatz, director of Kroger Food foundation (national president of IFT); I. T. Hutchings, director of research, H. J. Heinz Co.; and Gale Ammerman of Purdue University.

"Food technology was presented as a young profession, where compensation is in terms of serving mankind, where one can lead a happy and well-adjusted life, and where the alert and creative mind has the world at its feet. The shortage of food technologists was stressed, but at no time did we wave the high-salary banner."

Mr. Davin, your comments point up a good pattern for career promotion. But were the students impressed?

. . . "Encouragement came to the members who sponsored this meeting as they observed the keen interest displayed by the students during the counseling session."

"Excelled Others by Far"

And how did the program compare with other career guidance efforts?

. . . "During this campaign of ours, I had the opportunity to watch the approach and methods of other groups, and I am of the opinion that the grassroot movement excelled others by far."

Now, what about that cooperation on the part of local newspapers? Well, we have before us the December 30 issue of the *Indianapolis Star Magazine*.

Its 2½ page lead article is entitled "There is Adventure in Food."

That kind of newspaper cooperation, the participation of guidance directors, the student turnout, and the fine participation of local and out-of-state food men was achieved only through much footwork.

If all IFT sections would take a tip from Indiana, enrollment in technical food courses would be significantly increased. And if leading food companies got together and did likewise in other cities, then the industry would be on the way to solving a serious problem.

How Crane plastic pipe is cutting costs —even in tough acid services

Metal pipe and fittings would last about 30 days in the battery test tanks of Globe-Union Inc., leading storage battery manufacturer. Sulphuric acid concentration would build up gradually until a destructive electrolytic action was set up with the metal piping materials.

Eighteen months ago, Crane polyethylene pipe replaced the metal pipe and fittings. Although in continuous use, recent examination of the plastic piping revealed it to be as good as new.

Use of Crane plastic piping expanding

Made of nontoxic virgin resins, Crane plastic pipe and fittings now are used to carry more than 30 chemicals and products such as beer and other beverages, acids, salt solutions, and alkalies.

Crane plastic piping is lightweight, can be easily installed by one man using simple tools, saves manhours and is not affected by freezing. It is available in standard wall and pressure-rated pipe, with working pressures up to 100 psi at 75° F.

Ask your Crane representative for a new booklet describing Crane plastic pipe and fittings.

CRANE PLASTIC PIPING

VALVES • FITTINGS • PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

Mr. Technologist: Here's How You Can Deliver "Plus Values"

—and thus increase your worth to the company, while boosting your prestige

PART I—Helping Salesmen, Finding New Uses for Products, Training Personnel*

W. R. VAN METER
Food Technologist, West Hartford, Conn.

THERE ARE NUMEROUS ways that you, the food technologist can expand your value to your employer—that is, over and above the performance of the strictly technical duties for which you were hired.

The "plus-values" can be engineered by applying your skill and training in areas *beyond* the initiation of quality control, sanitation, and research programs.

However, you yourself must find the ways, and must create the extra values. No one else can do it for you. Certainly not the boss, whose energy and effort must be concentrated on the broader management of the business.

It is pertinent here that in many companies the food technologist is either the only technical person employed, or one of a very small group having technical knowledge concerning the company's manufacturing operations.

Now let us cite some pointed examples of how food technologists have made themselves plus-value assets to their organizations:

Assisting the Salesman

First, keep in mind the fact that companies exist to produce and sell products. Also, that they make profits only when they make sales. Without good, sustained selling, therefore, the company will inevitably die.

But how does this matter of selling offer the food technologist an opportunity?

Specifically, salesmen literally live on information about the products they sell, and the uses to which they can be put. Further, it is, in most cases, the food technologist who knows all the facts about the company's products—about the particular raw materials from which they are made, and their overall use-potential.

The big companies have extensive programs designed to familiarize their salesmen with these facts. The technical sales and sales' service departments have been built up to exploit every bit of information that can be channeled to the salesmen.

But assume you are employed by one of the hundreds of smaller companies where no such highly organ-

The technical man can tap many talents.

* Concluding Part II, scheduled for April FE, will spotlight the preparing of digests on developments, creating new ideas, ranging the raw materials, and making personal contacts that pay.

. . . Aiding salesmen

. . . Creating new uses

. . . Explaining how's and why's

ized program exists. Why shouldn't you, as the company's food technologist, write up an informational series about your products and about the raw materials used in their preparation? Such factually accurate pieces can be most effective, particularly where they are kept readably brief and are couched in plain, interesting language.

Suppose your company is putting out a line of condiment sauces which are distributed through normal retail outlets, such as supermarkets, and through institutional outlets, such as hotels and restaurants.

Food brokers are your company's contacts with the market, and to maintain liaison with them a small group of special representatives are employed.

It is to these representatives and brokers that your material must be slanted. If the products are, as stated above, condiment sauces, then write a short piece about the different kinds of vinegars that are used. Another could be written on tomato puree, if that is an ingredient of the sauce, and still another on spices, telling where they come from and how they are handled. A brief discussion of unit processes as they apply to the manufacture of your products can also be interesting and helpful.

Anything that gives a salesman more information about the product he is selling can be most useful to him. There is nothing quite so deflating to a sales' argument as a customer's question about the product which cannot be answered readily by the salesman.

The above material should not, of course, concern confidential process data, raw material sources, or the like. Rather, it should be the general background information which you, as a food technologist, can write and interpret for the use of the salesmen. In doing so, always remember these three things: *Be brief. Be accurate. Be interesting.*

After you have written several pieces, let someone such as your wife read them. If she finds them readably understandable, Okay. If not, then you have been guilty of slovenly technical writing—and perhaps lazy and dull writing, for which there is no excuse.

But assuming that you have done half a dozen short informational pieces that have passed the Missus, then take them to the boss and the sales manager.

You will find, I think, that the material will be welcomed and used. In most cases, you will also find that you have added to your own prestige. For you have demonstrated that you can use your training to help the boss in his field.

Discovering New Uses for Products

One thing that has always intrigued this author is the readiness of the average food technologist to embrace projects leading to work on new products—while often failing to keep in mind the new-use angles on those products already in production.

After all, discovering a new use for something you are already manufacturing is equivalent to developing a new product. Without some of the headaches of a new product, too, it might be said!

Sometimes this can have its humorous angle, as in the case of the manufacturer of a widely known meat sauce. One customer, an antique collector, wrote the company that she had discovered a terrific new use for its product. It was, she wrote glowingly, absolutely the best polishing agent on the market for restoring the shine to antique brass and copper buttons!

The combination of vinegar and salt in the sauce did the trick all right. But this was hardly the sort of new use the manufacturer wanted to advertise.

A classic and highly successful example of recent times, though, is the development of uses for soft cream cheese. For years this product was sold merely as a spread for snacks. Then, suddenly it was found to be useful in making cake icings and fudge. It took someone—I hope it was a food technologist—to look at the product with open eyes and make a new appraisal of its possibilities.

New uses for an old product mean a widened market, more sales, and greater profits.

Possibly, food uses are more limited than would be the case with other materials. But unless you try hard to find them, there can be no assurance that you have really covered the field. Your product may be more versatile than you think.

And it's nice if you, the food technologist, are the one to go in and tell the boss about a new use you've found for his product. Better that way than having some guy down at the advertising agency, or his Aunt Hettie, come up with something you should have recognized first. So take a good look

around—see if you can't put your finger on that "plus" idea first.

Training Plant Personnel

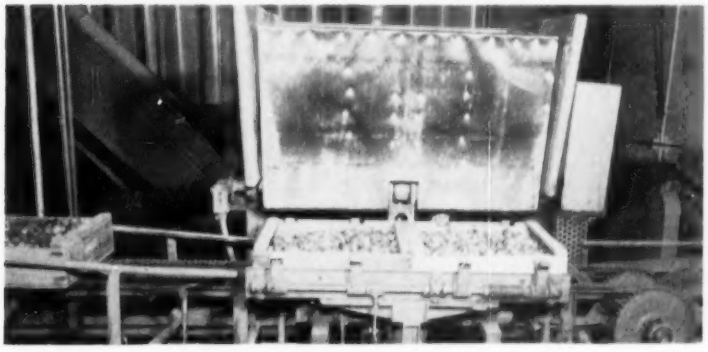
In some plants there is need for greater knowledge on the part of both supervisory personnel and those below them, relative to the basic principles underlying the technical part of their jobs. It is possible that the well trained food technologist might make a contribution here.

Or there might be a need for discussion groups, on an informal seminar-type basis, among the technically trained personnel. Many of the larger companies in the chemical industry have organized this type of activity on a very efficient basis. In the smaller plants, however, the project would have to be tailored to fit the needs of the particular situation.

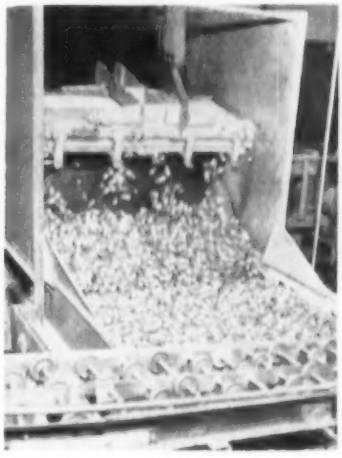
The point to be made is that the food technologist has something very real to offer here. He should be aware of this fact and be ready to help.

Activities of this sort—call them adult in-plant education, for lack of a better term—offer certain pitfalls, it is true. Questions of the proper use of company time and the like are raised. Therefore, anything of this nature will first have to have management's benediction. But it is certainly within the bounds of propriety for the food technologist to call to management's attention the value of such information sharing, and to speak up about his own willingness to contribute.

Finally, you'll discover that on a personal level this sharing of information is a most desirable thing in your day-to-day contacts with your associates. *End*



DATE BOXES enter dumper on chain conveyor and depress three limit switches to start action. Electric-driven hoist rotates boxes against cover plate.



TURNING completely over, hoist then reverses. Electronic timer holds carrier while dates spill down cover plate to take-away belt.

ADAPT DUMPER TO STICKY FRUIT

JACK WALKER

Plant Engineer, California Date Growers Assn., Indio, Calif.

FOOD ENGINEERS are forced—much more than their opposite numbers in other industries—to take machines designed for one specific use and adapt them to their own, differing needs.

Here is a recent materials handling example: An avocado box-dumper converted to handling dates by the addition of an electronic timer and some extra limit switches.

The timer is neccessary because dates are lighter and stickier than the avocados, thus need a timed dumping period to release fruit from the boxes.

Since box sizes for this product differ, four limit switches provide the flexibility for handling small boxes, two at a time, or two larger sizes one at a time.

Filled boxes (small size) move onto the dumper cradle by a roller-chain conveyor. First incoming box moves across loader and strikes the No. 1 limit switch—which also serves as a box stop.

The next box closes Switches 2 and 3. When a third box reaches No. 4 and closes it, chain conveyor stops and halts incoming boxes.

Closing of the first three limit switches energizes a magnetic switch that controls operation of the cradle lift-motor. As this motor starts, a holding contact in the magnetic switch maintains operation while cradle is clear of the limit switches.

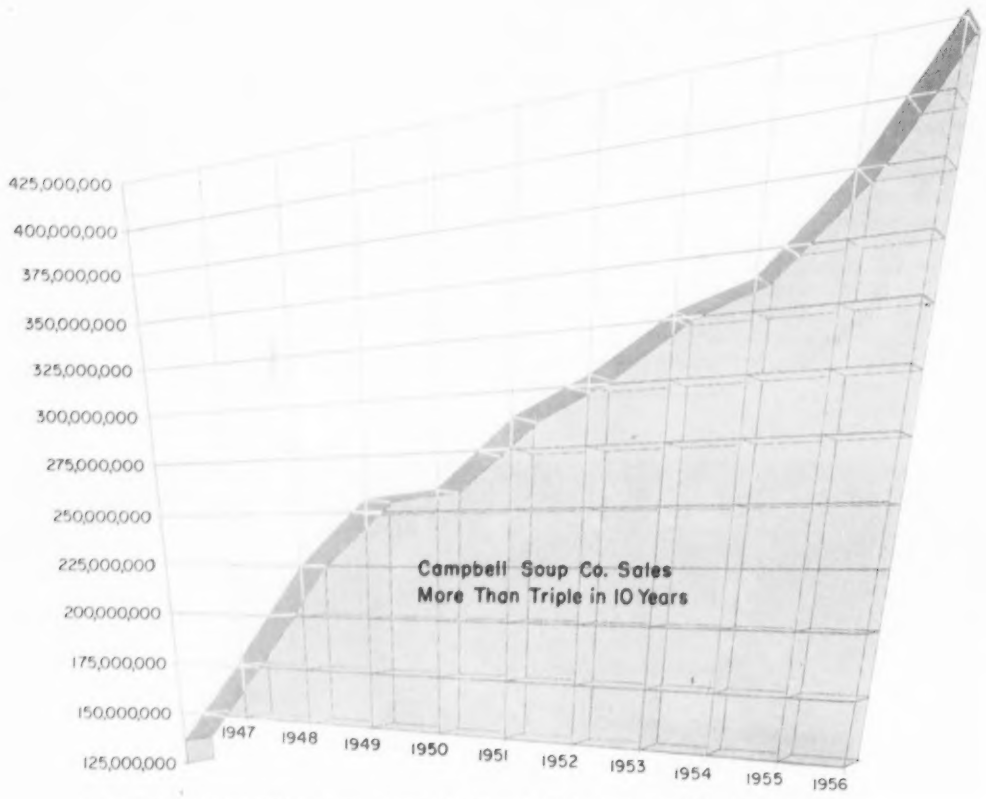
Cradle lifts boxes against a cover plate, which pivots on the cradle shaft and is held against boxes by an air-powered cylinder to prevent date spillage. As cradle rises, clamps swing over boxes, locking them to cradle.

Loaded cradle and cover rotate 225 deg., coming to a stop directly over take-away conveyor. Here, a contact switch on the cradle-drive closes an electronic timer.

Then the air cylinder releases cover plate. Cradle rises 90 deg., and timer halts carrier for a 1½-sec. interval. This permits dates to fall from boxes and slide gently over the cover plate to the take-away belt.

At the end of the timed cycle, an auxiliary relay starts cradle motor, and both cradle and cover plate return to loading positions. Here, clamps release from boxes, which are removed from unit by the re-started loading conveyor.

Timer is adjustable over a 12-sec. range. The 1½-sec. period is the minimum interval required for complete discharge of dates and permits 9 dumps per minute. *End*



POSTWAR SALES SPURT more than triples Campbell's business. And the factors responsible for this pace-setting gain form a pattern for progress in food manufacturing.

Take a Look at a Pacesetter

Pattern for progress in food manufacturing lies behind big gains by Campbell Soup. Success factors are basic

FRANK K. LAWLER
Editor, "Food Engineering"

WHAT WILL IT TAKE to make a food manufacturing firm highly successful in the years ahead?

This is no academic question. Competition is tough and getting more so. Profit margins are slim. Costs are steadily increasing. New products are limited to the relatively prosaic things that people eat. And the overall market growth is only about 5% per year.

One of the best ways to see what it takes is to consider the basic policies and practices of the pacesetters. Details of successful management will vary widely among different types and sizes of food companies. But the basic concepts of the job to be done apply universally—even if on different scales.

You can pick any one of scores of firms with enlightened, progressive management for your yardstick. And on previous occasions we have pointed to pacesetters like General Foods, General Mills, and Green Giant. But in this instance, let's look at Campbell Soup Co. This long-time top performer has chalked up a terrific postwar spurt. Here is an old company with new ideas that stem from revitalized management.

Portrayed graphically at the top of this page, Campbell's net sales have jumped some $300 million in ten years, a gain of nearly 220%. The rise has amounted to about $91 million in the past two years, or 27%. Another substantial gain is almost certain this year.

Ratio of income (after taxes) to sales was 6.8% for the last fiscal year, ending July 31, '56; 7.7% the year before. The 1956 figure would have been even better except for failure of the eastern tomato crop in 1955, and the cost of integrating the newly acquired Swanson business.

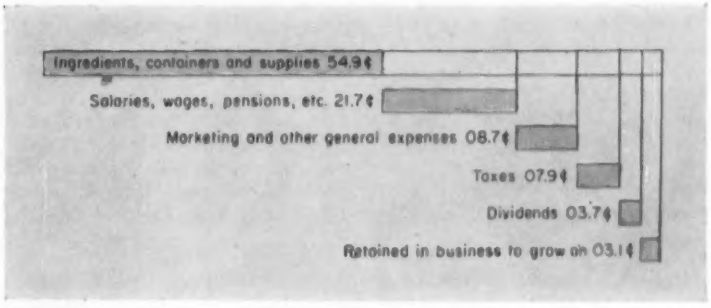
As percent of net worth, net income last year was 12.7%; the year before, 13.5%.

Now what besides effective advertising is behind Campbell's big gains? And what is Campbell doing to maintain its pace of progress?

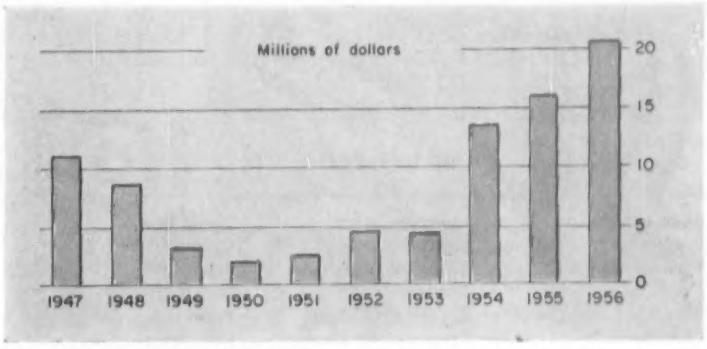
Major factors are quality control, research and development, advanced engineering, and capital investment—supplemented by acquistion of other businesses and improvement of their products.

Highly effective quality control is a cornerstone in Campbell's long record of success. In fact, quality control is a fetish of the firm. You will see, for instance, already carefully culled, top-grade frozen vegetables being spread out and meticulously inspected before going into soups. And much research is done on quality control techniques.

"To make the best, begin with the best—then cook with extra care," is the Campbell slogan.


Ingredients, containers and supplies 54.9¢
Salaries, wages, pensions, etc. 21.7¢
Marketing and other general expenses 08.7¢
Taxes 07.9¢
Dividends 03.7¢
Retained in business to grow on 03.1¢

BUSINESS GROWTH INVESTMENT of 3.1¢ of each sales dollar was made by Campbell in past fiscal year. Other income allocations also are indicated on chart.



BIG CAPITAL EXPENDITURES to up efficiency and capacity are key factor in Campbell's rapid progress in recent years, and will help to insure a continuation of its growth trend. Last year, the figure was $20.6 million. This year, a $27½ million expenditure is planned.

129 Improvements in Year

But the company knows that good old-line products are not enough in these days of changing eating habits. So it introduces new ones. Its line of frozen soups is a relatively recent example. So also is its Swanson line of frozen convenience foods.

Research is continually developing new Campbell products and improving existing ones. And a Wall Street estimate puts at 25% the increase in expenditures this year for agricultural, product, and marketing research.

Emphasis in product research is on convenience items, five new ones being introduced nationally last year under the Swanson label. Three of these are frozen—chicken a la king, blueberry pie, and peach pie. Two are heat processed—chicken a la king and chicken fricassee.

But that's not all. As business builders for the future, product research came up with more than a dozen other products for market testing in the months ahead. Many of these are frozen items—convenience foods not now available to the public.

In addition, no less than 129 improvements in product formulas and manufacturing procedures were made in 1956. All are aimed at still higher quality products, produced more efficiently. This tops by a wide margin an enviable 50 such advances during the previous year.

Raw materials improvements also are coming out of research. A number of improved varities were studied in 1956, and commercial-scale tests will be made of some this year.

Success in this work with tomatoes will permit them to be grown commercially in sections of the country where none grow now because the temperature is too cool or too hot.

Another important phase of research is aimed at the development of new machinery and materials for processing foods and manufacturing containers. A substantial number of projects is under way. This is a vital part of an all-important program to improve productivity in manufacturing.

Researches Packaging

Now in its second year, the container division is staffed with experienced research, procurement, and production executives. Their activities are concentrated on improving can-making techniques and the design and installation of required container machinery. You can expect to see some unique achievements in canning line efficiency and control.

All this adds up to a lot of research. But still more is being done to insure the future. Campbell recently established a basic research department, the ultimate aim of which is improvement in ingredients and products. And broad studies of the nutritional qualities of Campbell products, instigated several years ago, have been expanded to include all of the firm's items.

Little basic research is done in the food industry, yet it is most important to long-range progress. Nor is there much original research on the nutritional qualities of specific manufactured items. This shortcoming is laying the industry open to such hazards as the current nutritional attack on certain fats.

Keeps Prices Steady 5 Years

Undoubtedly a significant factor in Campbell's recent sales growth is this outstanding achievement—prices of its major products were not increased during the past 5 years. How was this possible in the face of higher wages and other costs? It is one of the benefits of advanced engineering and capital expenditures that pay off in operating economies.

$27½ Million for Plants in '57

In the past ten years, the company has spent no less than $85,435,044 for land, new plant, and equip-

ment in the U. S. and Canada, all of it financed out of earnings. The outlay last year alone was $20,599,618.

On top of this, further projects totaling $27,500,000 had been approved at the end of the past fiscal year.

One measure of the pay-off through improvements resulting from capital expenditures is the fact that Campbell added 7% more employees in 1956 while achieving an increase of 13.8% in sales.

Construction of the new plant at Napoleon, Ohio, will be completed this summer. A major plant rehabilitation and improvement program, plus a new general office building, are projects under way in Camden. A new finished-products warehouse is being built at Sacramento. More manufacturing facilities are planned for Canada. Substantial improvements in Swanson plants are being made. New mushroom growing facilities are planned for California, and those in Illinois will be expanded. Additional research facilities have been provided at Prince Crossing, Ill.

Campbell has two factories in Camden, N. J.; one each in Sacramento, Calif.; Chicago; Napoleon, Ohio (under construction); and New Toronto, Ontario—plus its Swanson plants in Omaha, Neb.; Worthington, Minn.; Fayetteville, Ark.; Salisbury, Md.; and Modesto, Calif.

Campbell's engineering department is among the best. It comes up with advances like the continuous noodle process. Here dough is sheeted and slit into ribbons that are cut into lengths that fall directly into soup cans—no handling, no drying. And the engineers design complete plants, like the relatively new one in Camden for frozen soups. That one set a new high in fast, continuous immersion-freezing. It is virtually automatic and highly economical of man-hours.

CAMPBELL PRODUCTS

Heat Processed Soups (Condensed)

Bean with Bacon	Clam Chowder	Green Pea
Beef	Consomme	Onion
Beef Noodle	Cream of Asparagus	Pepper Pot
Black Bean	Cream of Celery	Scotch Broth
Beef Broth (Bouillon)	Cream of Chicken	Tomato
Chicken Gumbo	Cream of Mushroom	Vegetable
Chicken Noodle	French Canadian Pea (Canada Only)	Vegetable Beef
Chicken with Rice		Vegetarian Vegetable

Ready-to-Serve Soups (for Restaurant Use)

Bean	Chicken with Rice	Green Pea
Beef Noodle	Chicken Gumbo	Tomato
Clam Chowder	Cream of Chicken	Vegetable
Chicken Noodle	Cream of Mushroom	Vegetable Beef

FRANCO-AMERICAN PRODUCTS

Clam Chowder* (New England Style)	Fish Chowder	Snapper Soup*
Cream of Potato	Green Pea with Ham	* Regional distribution only
Cream of Shrimp	Oyster Stew	

Other Products

Tomato Juice	Ketchup
Pork and Beans	(Canada Only)

Franco-American Products

Beef Gravy	Spaghetti with Meatballs	Spaghetti Sauce with Mushrooms
Macaroni	Spaghetti Sauce with Meat	
Spaghetti		

V-8 COCKTAIL VEGETABLE JUICES

SWANSON

Heat-Processed Products

Boned Chicken	Chicken a la King	Chicken Spread
Boned Turkey	Chicken Broth	Whole Chicken
	Chicken Fricassee	

Frozen Products

"TV" Brand Beef Dinner	Chicken a la King	Blueberry Pie
"TV" Brand Chicken Dinner	Beef Pie	Cherry Pie
	Chicken Pie	Peach Pie
"TV" Brand Turkey Dinner	Turkey Pie	Packaged Poultry & Parts
	Apple Pie	

Integration for Efficiency

One of Campbell's major achievements last year was the integration of the Swanson operation, acquired on May 6, 1955. Sales and distribution practices were fully integrated, procurement was coordinated or combined, and Campbell research and quality control techniques were applied to Swanson products.

Eight of the eleven subsidiaries of C. A. Swanson & Sons were liquidated or merged to simplify the corporate structure. Two more are being liquidated.

Campbell is concentrating Swanson activities on canned and frozen convenience foods.

Saves Through Safety

Another factor in Campbell's economy is the maintenance of a good accident-prevention record. Last year the injury frequency rate on a company-wide basis was a low 5.05 lost-time accidents per milion man-hours worked. This is less than half the 12.16 rate in the food industry generally, and lower than the 6.96 rate for all industry. With 20,055 employees, a low accident rate not only is important to worker morale and welfare, but it saves a big item of wasteful expense.

Pioneering Convenience

Inherent in the long-time success and rapid current growth of Campbell Soup is the fact that it is a producer of several convenience foods, and good ones. It is, in fact, an outstanding pioneer in this field. Canned and frozen foods are highly convenient, and especially manufactured products like soup.

Campbell already has added to its product lines more than 40 convenience items not manufactured by it at the end of World War II. These additions constitute more than half the number of products it now offers to consumers. —*End*

OLD FILM: Loose and wrinkly, subject to splitting.

NEW FILM: Neat and tight, clearer view of product.

Packaging Change Pays Big Benefit

Turning to use of oriented Pliofilm as a bacon overwrap, Chicago packer produces neat, snug-tight package that curbs splits and rewraps

JOHN E. THOMPSON
President, Reliable Packing Co., Chicago

"TRY A LITTLE IDEA HERE, a little inspiration there. No new angle is too small to investigate."

That's been the thinking back of our package improvements at Reliable Packing Co., Chicago.

One idea that has particularly paid off has been our recent switch from a regular grade of Pliofilm to an oriented one (Tee-Pack's Snug-Pak) for overwrapping sliced bacon.

Today, this change is rewarding us handsomely—for it has cuts down the quite heavy return of faulty packages and, accordingly, saved tedious re-wrap chores. Moreover, the old wrinkled look of the package has been licked.

Problem and Solution

We'd been packaging our bacon the same as other meat packers. That is, we scaled our slices on bacon boards, then machine-overwrapped them with a variety of transparent materials.

But by the time the packages were ready for sale, some had split open. And subsequent retail-store handlings brought additional damage to the overwraps. All this shot up the percentage of returns. Generally, the package appeared loose and wrinkly.

We studied the problem. And initially, the weight of the blame was laid at the door of poor package design. But it then developed that this wasn't it. Actually, the splits occurred at random. In fact, three out of a dozen cartoned packages that we opened were splits.

We finally figured that the overwraps became brittle while stored in the cooler and awaiting shipping. But we had to cooler-store the bacon to maintain quality.

So various types of overwrap materials were tested for effectiveness, and this study spotlighted the merits of the oriented Pliofilm. It was then selected.

What It Is

Oriented Pliofilm is stretched uniformly during manufacture, both longitudinally and across the web. This causes its molecules to become properly oriented (aligned). In this way, the film's mechanical properties are distinctly improved.

We brief below the several advantages of this film which we have observed:

. . . Greater strength than that of the formerly-used film. As a result, very thin gage (50 in our case) can be used with corresponding higher yields per pound of film.

. . . Remains strong and ductile at low temperatures.

. . . Is easily shrinkable in all directions at 180F. (with use of infra-red lamps, in our case).

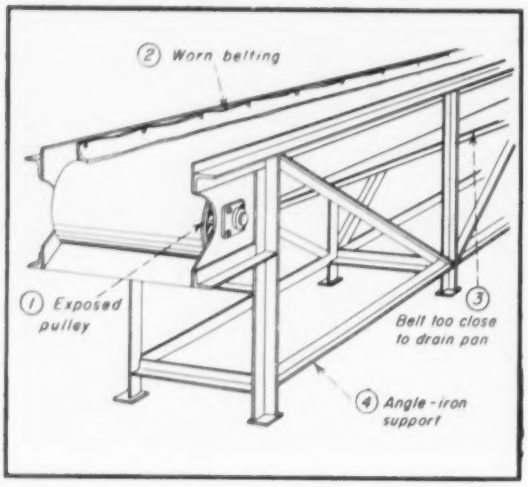
. . . Conforms to board-packed sliced product after shrinking to form a snug-tight package.

. . . Is transparent and has high gloss.

. . . Applies easily (Hayssen machine in our plant).

. . . Prints readily for positive brand identification.

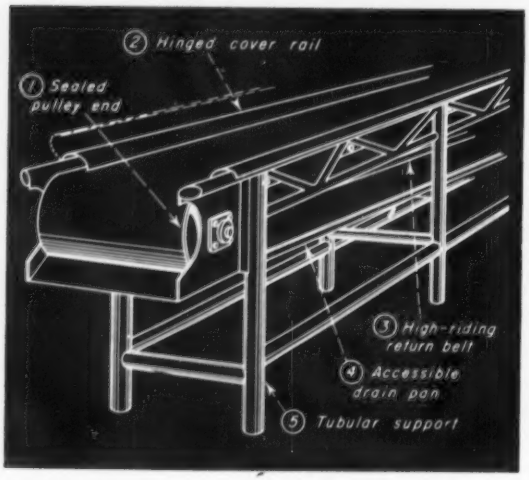
Avoid these conveyor defects . . .



CONVENTIONAL conveyors may have these faults:

1. **Exposed pulley** (with recesses or open joints), accumulates debris, hard to clean.
2. **Worn belting** (fabric core exposed) traps product particles. They're difficult to dislodge.
3. **Return belt** too close to drain pan. This prevents easy inspection and flushing.
4. **Angle-iron supports** are dirt catchers.

. . . with this sanitary construction



IDEAL design offers:

1. **Sealed pulley ends** (and rollers) keep out dirt.
2. **Hinged rail cover** (tight-fitting) snaps back for easy and efficient cleaning.
3. **Return belt** "idled" well above drain pan, permitting unimpeded drainage.
4. **Drain pan** easily accessible for flushing.
5. **Tubular supports**—no dust-retaining flat surfaces.

Your Sanitary Food Equipment

How to Specify It . . . Install It . . . Keep It Clean

There's no mystery about making your food setup sanitary and easy to clean. It all comes down to elementary rules of materials, design, and installation—with sharp attention to specific do's and don'ts as accented in this "working" article

C. K. WILSON

Vice-President, Food Machinery & Chemical Corp. San Jose, Calif.

WHAT SPECIFIC sanitary features should you look for in food-handling units? And how can you make sure they'll stay clean?

In the answers to these questions lies the fundamental maxim of sanitary design—that is, to see that your food is not contacted by materials that deteriorate product quality and pose health hazards.

Thus, your properly designed and installed food-processing unit will:

1. Prevent contamination of foods by such agents as materials of construction, condensate, and lubricants.

2. Be readily dismantled for complete cleaning.

3. Have no hard-to-clean areas (cracks, crevices, dead ends) where contaminants may collect.

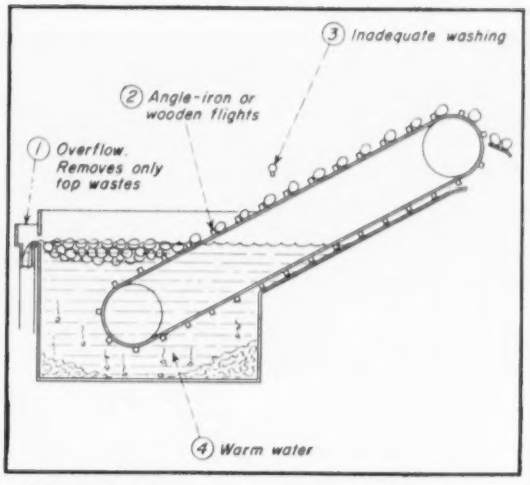
From the above it is obvious that selecting the best unit for a given application entails a knowledge of materials, construction, and installation. So we will develop the principles of good sanitation practice by reviewing and commenting on these factors.

We will start with a rundown on the sanitary suitability of commonly used materials of construction:

WHICH MATERIAL?

Wood is unsatisfactory for most food-handling equipment since it is porous and cracks with age. Juices readily penetrate its surface, become sour, and create objectionable

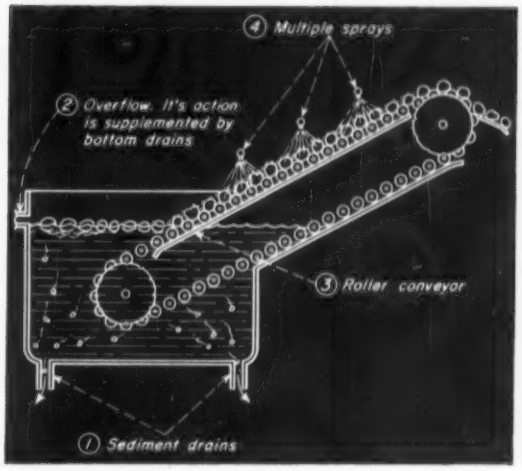
This insanitary fruit washing . . .



CONVENTIONAL washers are not sanitary if they have:

1. **"Off-the-top" overflow only.** No provision for removal of contaminated sediment from tank bottom.
2. **Angle-iron or wooden flights.** They're hard to clean.
3. **Inadequate washing.** Fruit doesn't roll to let spray contact all product surfaces.
4. **Warm wash water.** It's in the temperature range for rapid bacterial buildup.

. . . is corrected by these features



IDEAL fruit washers provide:

1. **Bottom drains** that continuously remove sediment, which otherwise would accumulate in tank.
2. **Auxiliary overflow** to eliminate floating debris.
3. **Roller conveyor** that is self-cleaning and exposes all fruit surfaces for thorough washing.
4. **Multiple sprays** positioned for maximum fruit-washing efficiency.

odors, also foci of contamination.

Black iron and cast iron usually should be limited to framework for machinery. For they are less satisfactory than other metals for food contact because of their susceptibility to corrosion, which roughens their surfaces and makes them difficult to clean. Also, iron frequently causes discoloration in certain foods.

Where such metals are used, they should have protective coatings of paint or enamel.

Steel has many uses where strength and hardness are required, such as shafts and cams. However, it rusts readily under moist and acid conditions, thus should be avoided as food-contact parts. And like iron, steel may cause product discoloration.

Galvanized iron may be acceptable for pipe and sheet metal, but not where friction occurs because the zinc coating wears off, whereupon corrosion results. Furthermore, zinc is soluble in most fruit acids, and may be absorbed by green vegetables to produce a dark-green discoloration. Alkaline detergents should not be used on galvanized iron since they dissolve zinc.

Stainless steel generally is the preferred material for food-contact parts in most equipment. It resists corrosion by nearly all foods and cleaning materials, does not discolor, and remains bright and smooth with use so that cleaning is easy. However, stainless steel is corroded by sodium chloride, thus should not be used for salt brines.

There are many types of such steels, so choose the correct one for a given condition.

Monel metal, a copper-nickel alloy, has considerable resistance to corrosion. But it should not be used in equipment handling corn, lima beans, peas, and beans, where a small amount of copper may produce darkening. However, monel is preferred to stainless steel for holding or conveying of salt brine and for picking tables, hoods, etc.

Brass, copper, and bronze are fairly resistant to corrosion. But they, too, should not contact corn, peas, or lima beans, or the brine in which these items are canned, since product discoloration may result.

If certain machines must incorporate these metals, their product-contact areas should be tin coated. This coating is removed by wear and by alkaline detergents, which expose the copper underneath. Therefore, renew the coating as needed.

Aluminum, when alloyed to form rigid and corrosion-resistant metals, has a place in construction of lightweight equipment. Such alloys are excellent for sheets, pans, lug boxes, etc. Unalloyed, aluminum is too soft and readily corroded by alkalis and certain acids. Electrolysis is also a problem.

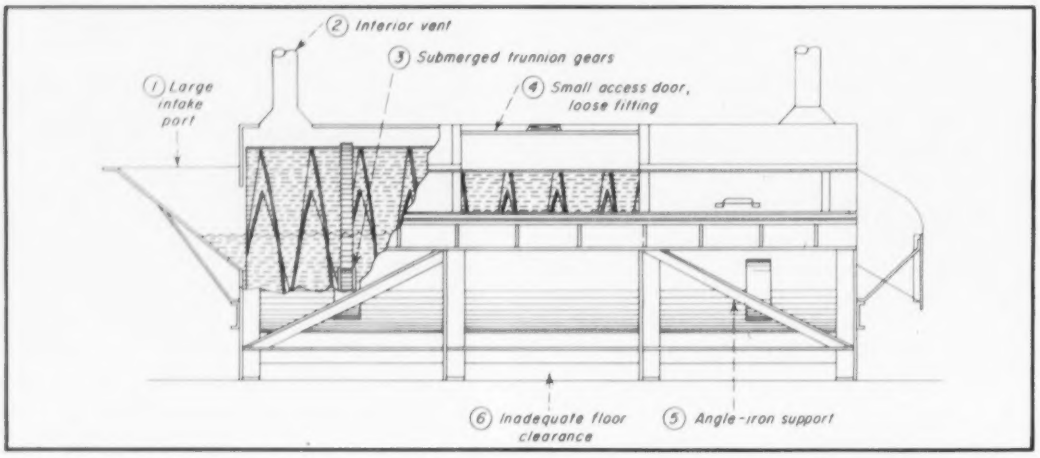
Solders containing more than 5% of lead should not be used in the product zone. Alloys containing a large proportion of lead or antimony (babbitts), or coatings and platings of cadmium are not recommended in any part of a food machine, especially within the product zone.

Don't use any metal which, when in contact with food, may form a harmful compound or toxic substance.

Glass is useful as a lining for vats and tanks, or in piping. Heat-resistant glass tubing, when properly installed, is satisfactory because it does not readily corrode and is easily cleaned and inspected in place.

Enameled pans and equipment are not satisfactory, because the enamel chips readily and may be left in a food. Also, cracks may form in which bacteria grow. Enamel linings may be used for brine tanks, storage vats, digestors, etc., if such linings are

This water blancher is hard to clean . . .


(2) Interior vent
(3) Submerged trunnion gears
(1) Large intake port
(4) Small access door, loose fitting
(6) Inadequate floor clearance
(5) Angle-iron support

CONVENTIONAL blanchers may have some of these drawbacks: (1) **Large product intake port** that makes end of drum inaccessible for cleaning and inspection (also permits heat loss from blancher headspace); (2) **Interior vents** that foster bacteria growth by permitting rapid cooling of headspace; can cause product contamination as well as increased cleaning difficulty; (3) **Submerged trunnion gears** are inaccessible for easy cleaning; (4) **Small** access door prevents effective interior cleaning (its loose fit also permits heat loss); (5) **Angle-iron supports** collect dirt; and (6) **Inadequate floor clearance** prevents thorough cleaning under machine.

continuous and care is taken not to crack them.

Rubber is satisfactory for belting, and rubber hose may be used as pipe extensions on syrup lines or as joints for conveying lines.

However, there is no truly impervious rubber, thus sections of hose, belting, and pipelines should be readily demountable for thorough cleaning and inspection. After extensive use, rubber is often badly cracked or so worn as to expose the fabric, which makes cleaning difficult. Replace before this occurs.

Fabrics and fibers absorb juices and provide fertile media for growth of microorganisms. As a result, these materials frequently have a bad odor and contaminate the product. In addition, bristles may enter product.

Cloth or canvas belting are not recommended as product guides or slowdowns, because they generally are unsightly after a few hours of use, and may foster bacterial growth.

Plastics are not yet widely used in food plants. However, such plastic as Tygon tubing is replacing rubber because it is more impervious. And certain of the newer plastics offer possibilities as food-contract parts.

HOW BUILT?

The task of keeping food equipment clean is greatly simplified when units are properly built for the application, as indicated below:

Framework or supports of angle or channel iron should be eliminated, wherever possible, and replaced with steel tubing because:

1. Stronger, light construction is possible, and with fewer joints.

2. There are fewer flat surfaces to catch and hold food particles or other debris.

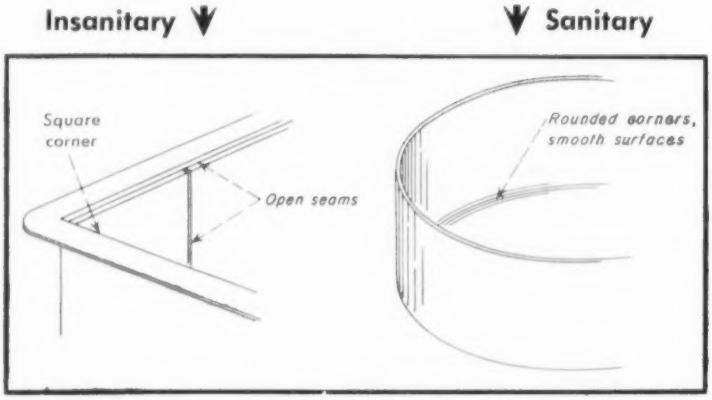
3. Water and juices readily run off, corrosion is minimized, and paints last longer.

4. Cleaning is easier.

In tubular construction, supporting brackets should be welded to the posts, with all tubes capped. Avoid drilling, except in the bottom to drain out condensate, because holes decrease strength and permit entry of liquids.

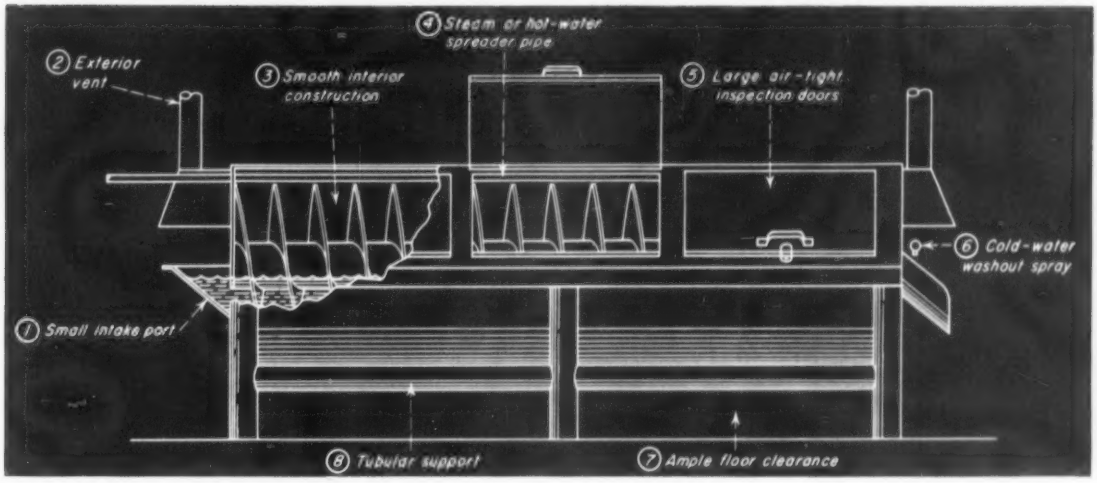
Treating steel tubing with phosphoric acid before painting improves paint adherence.

Junction points between pipes and tanks, or any two surfaces, must be smooth. And they should have no projections, corners, or cracks, which might hold food or harbor bacteria. Sleeve joints must be avoided, since cleaning is then difficult. Junction



OPEN SEAMS and square corners on vat at left catch food particles, which makes cleaning difficult. However, tank at right with corners rounded and all surfaces smooth, offers easy sanitation.

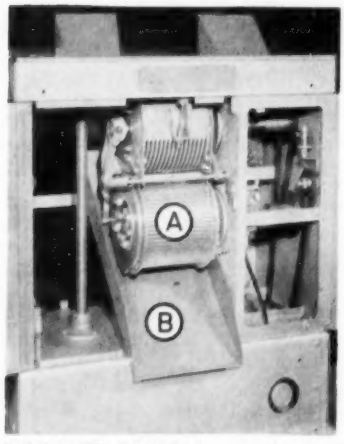
. . . but sanitary model offers maximum access


4 Steam or hot-water spreader pipe
2 Exterior vent
3 Smooth interior construction
5 Large air-tight inspection doors
6 Cold-water washout spray
1 Small intake port
8 Tubular support
7 Ample floor clearance

IDEAL blanchers are designed with: (1) **Small intake port** below water level for effective air seal; (2) **Exterior vents** (which curb heat loss) avoid bacteria-growth temperature range in headspace; (3) **Smooth interior** construction for easy cleaning; (4) **Steam or hot-water spreader pipe** (which holds proper headspace temperature) simplifies cleaning; (5) **Large air-tight doors** for easy inspection and cleaning; (6) **Cold-water washout spray** to cool product discharge chute, thus minimizing bacteria growth; (7) **Ample floor clearance** for under-machine cleaning; and (8) **Tubular supports** for easy cleaning.

points should be butt-welded and ground smooth, rather than lapped or off-set.

Dead ends consist of sealed-off pipes or pockets into which product may flow and be temporarily or permanently held. Such spots often are foci of bacterial contamination and must be eliminated. Pay special attention to thermometer wells, drains, or unused pipe extensions which have been capped.



SANITARY DICER has circular knife assembly (A) that can be completely disassembled for thorough cleaning. Discharge pan (B) is also easily removed.

Easily dismantled units: All equipment with enclosed surfaces which may contact food, or from which juices may drain into a food, should be easily opened or dismantled for cleaning. Included are pumps, finishers, and fillers.

Whenever possible, a threaded stud and wing nut should replace the tapped hole and bolt in parts to be dismantled. Bayonet-lock construction is widely used as a quick-opening, tool-less substitute. Some panels or cover plates may be held securely and opened easily with various types of spring or screw clamps. But avoid clamps that tend to be dislodged by vibration.

Open seams formed by adjoining machine parts trap foods, and are difficult to clean. Butt-welded seams, ground and polished, are preferred.

Horizontal areas collect debris, thus should be avoided. A slope on what might normally be a horizontal section makes them self-cleaning.

Smooth surfaces of non-corrodible material are essential for all parts of a food machine within the product zone. Preferably, they should be polished, but in any case, free of cracks, crevices, pits, and folds.

Protection against droppings is afforded by sufficient overlap on covers. They should have channels to carry off foreign material that may fall into a machine when lids are raised.

Stuffing boxes must be accessible for examination and cleaning. Packings of felt, leather, or cotton are not desirable. Use a properly designed rotary seal.

Air filters should be provided on all air lines.

Pistons or plungers should be smoothly machined. If rings are needed, they should be of metal. Under some conditions and with certain products, synthetics may be acceptable.

Coved or rounded corners, with smooth finishes, should be standard on all flumes, screw conveyors, fillers, and storage or cooking tanks. Slime builds up in square corners and is difficult to remove, while coved surfaces are easily cleaned. However, corners coved on a radius of less than 1 in. are difficult to clean.

Rolled under or protected edges can accumulate food particles, which may be difficult to remove.

Open steam lines require check valves opening to the atmosphere to prevent product from being sucked back into the line when steam is turned off. A trap and strainer catches condensate and prevents rust flakes from entering the product.

Hoods conduct steam or fumes from equipment to outside the building. There must be a catch basin at the lower edge to prevent condensate from running back into the product.

Sanitary pipelines, and their auxil-

iaries and fittings, should meet these seven requirements: (1) Structural materials non-corrodible, all parts easily dismantled for cleaning, inspection; (2) joints smooth and flush, no cracks or crevices into which food may penetrate; (3) all threads outside, (4) no dead ends, sleeve connections, bent or dented pipes, or sharp corners; (5) no sags that retain product or cleaning fluid; (6) provision for easy in-place cleaning and self-draining where the installation precludes dismantling; and (7) non-leaking sanitary valves for lines under pressure.

Regarding the latter, units with rubber diaphragms are good because they have no pockets in which food can lodge.

Coupling nuts should have sufficient clearance (three times width of nut), or be specially constructed for removing or dismantling.

Submerged inlets, as for water, should not ordinarily be used for kettles, tanks, or troughs. Where they can't be avoided, approved vacuum breakers are recommended (located at least 4 in. above rim of container or machine), with check valve between the vacuum breaker and water supply.

Waste from machines should not discharge directly to sewer.

SPECIFIC UNITS

Now to sanitation of commonly used food-processing equipment:

Metal tanks of galvanized iron deteriorate fairly readily when used for brining, thus exposing surfaces that rust and are difficult to clean. However, rust-resistant steel tanks have given excellent service.

Kettles should be of welded construction, and ground flush to a smooth finish. In some cases they require a high polish. Recommended covers for these vats are those made of two parts that are completely removable.

The underside of any fixed portion of a cover accumulates dried splashings, thus is difficult to clean. Covers should be constructed to open on a pivot provided by a loose hinge, a rod-in-socket arrangement, or some other type of removable pin hinge. Space formed by junction of all cover sections should be protected by a drip channel.

Tables used in fruit-processing or packing plants should be of all-metal construction, preferably of rust-resistant steel or Monel. They should have smooth welded seams, rounded corners, and edges turned down over a radius of more than 90 deg. Table tops should be welded to a pipelike stand with ball-shaped bottoms.

Tables used for cutting of meat, filleting and cleaning of fish, and cutting or cleaning of poultry may be fitted with small removable cutting boards and an opening for discharge of waste. This board should be in one piece, if possible, and not so large that it cannot be cleaned and sanitized. Set it into the table so that it rests on an open bracket, which may be easily cleaned.

Troughs should be of metal with welded seams and rounded or coved corners. Where large metal surfaces must be bent or stamped for added strength, bends or imprints should be wide and rounded.

If edges are beaded or rolled, they should be welded to close the resulting space. An open, slightly rolled edge of 180 deg. will give increased strength and furthermore, it can easily be kept clean.

Agitators should be suspended wherever possible, because this eliminates stuffing boxes or other sealing methods. If a suspended unit is not practical, a removable arrangement will permit complete and easy cleaning of the entire shaft, especially rotary-sealed parts that pass through the stuffing box.

Fixed suspended agitators may be of two types. The first has a power-driven shaft with one or more propellers attached. Agitator unit is fixed to a bridge extending diametrically across top of tank. Cleaning is greatly facilitated if propeller shaft, at the power end, is removable at a point above the tank. This can be accomplished by use of a notched shaft and locking device.

Second type is similar to the first, but agitator unit is fixed to a movable part of the tank cover so that the shaft is raised out of tank when cover is lifted. In this case, power end of propeller shaft should be removable at a point above top of tank cover.

Double-action agitators, with or without scraper blades, present a serious sanitary problem. Here a shaft operates with a drive shaft, each rotating in opposite directions, and bearings are within the product zone. Neither inner shaft nor bearings are accessible for inspection or cleaning because they cannot be easily dismantled.

Wherever practical, therefore, use a single-action agitator against suspended baffle plates. All parts then become accessible.

Submerged agitators, installed through bottom or sides of a tank, should be of smooth metal, have round corners, and be welded to the shaft. Latter should be removable at a point outside the tank.

The opening in tank bottom or side, which accommodates the shaft, makes cleaning difficult unless an all-metal rotary seal is provided. Use of such packings as leather, cotton, or felt make submerged agitators undesirable units.

Rotary seals are available in several designs. Some are all metal; others require a rubber ring or sleeve for tension. Each is easily disassembled, usually by removal of one nut. Sealing results when finely finished surface of the ring turns against the similar surface of the seal seat. Keep adequate pressure on the ring.

Cubers or dicers should have knife assemblies that can be completely disassembled for cleaning (see photo), since food particles and juices may seep between blades and spaces, causing an undesirable condition.

The finely slotted comb in which blades rotate should be carefully machined (no sharp corners) and also be easily removed for cleaning. Guides, push bars, trash pan, and chute should likewise be removable, and of smooth metal finish.

Motors and oiled bearings should be located so that no oil or grease can drip into product. Shaft bearings must have an oil seal and constant oil feed. If bearings are not kept full, products may work their way into them and become a source of contamination.

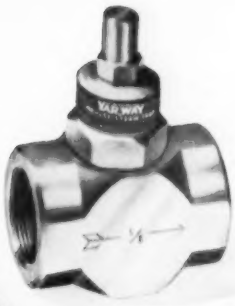
Drip pans must be placed under all motors and bearings to avoid any possibility of oil or grease dripping into a food. Pans should be large enough to hold all drippings for the operating period, and be emptied periodically to prevent overflow. Finally, don't let them get full of water during cleanup. —*End*

The above article is based on the author's address, "Sanitation in Food Machinery Design and Use," presented at the recent International Congress on Canned Foods in Rome. In his paper, the author drew upon "Information Letter #1528," Mar. 19, 1955. This publication of the National Canners Assn., Washington, D.C., contains recommendations based on a five-year study with drum-type water blanchers and horizontal belt conveyors.

½" No. 60 or 120

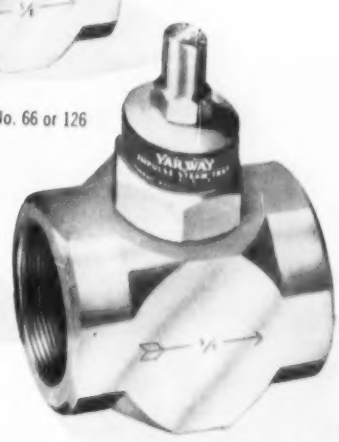
¾" No. 61 or 121

1" No. 63 or 123



1½" No. 66 or 126

1¼" No. 64 or 124



2" No. 67 or 127

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SERIES 120—same as Series 60 but for higher pressures and temperatures (600 psi, 750° F). Featuring all-stainless steel construction. Six sizes, ½" to 2".

SERIES 40—for *heavy condensate loads* requiring high capacity traps. Sizes ½" to ¾" in stock, larger sizes (1½", 2", 2½") available.

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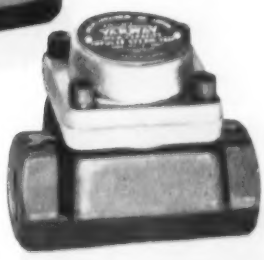
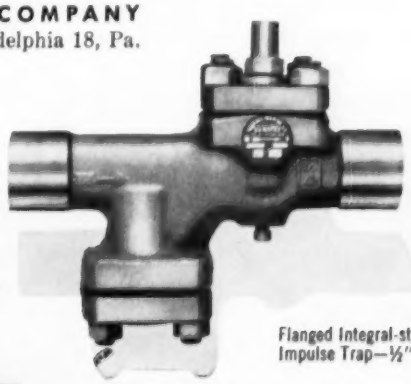
½" No. 20-A

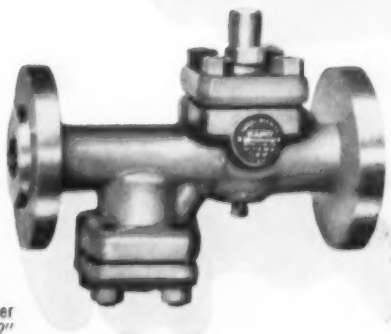
½" No. 40



¾" No. 41



Socket-weld Integral-strainer Impulse Trap—½" to 2"



Flanged Integral-strainer Impulse Trap—½" to 2"

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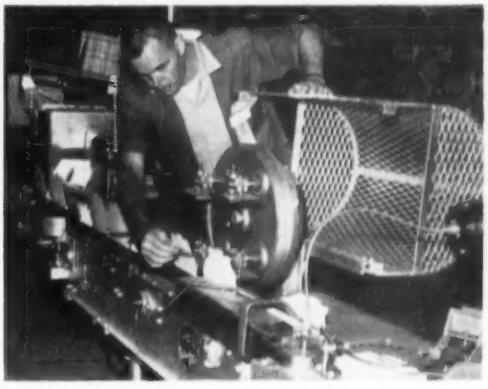
NEW YORK

5 Innovations For Packaging Lines Seen at Show

And space-saving freezer and cold-room doors were exhibited at recent National Frozen Foods Exposition

600 PER MINUTE is top speed of aluminum tray dispenser. Up to 200 trays are stacked in each of four feeders. Conveyor-driven oscillating fingers drop trays one at a time to belt, in 1 to 4 rows.—Reynolds Metals Co., Louisville 1. (79A)

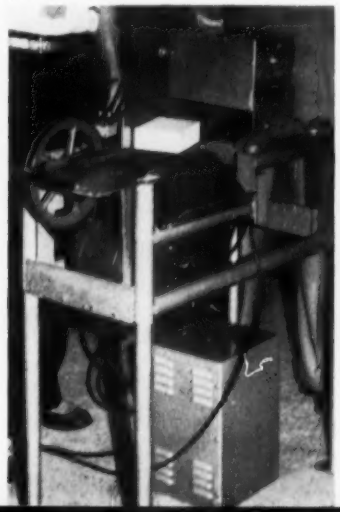
STACKER and counter operate with a former to pile 2 to 10 patties with paper separators. Flexible plastic conveyor stops while stack is made, then moves meat to packing table.—Hollymatic Corp., Chicago. (79B)



FAST CLOSING of cartons (250 per min.) is achieved with improved unit. Continuous feed conveyor is jam-proof. Revolving press head has 4 paddles.—Kliklok Corp., New York City. (79C)

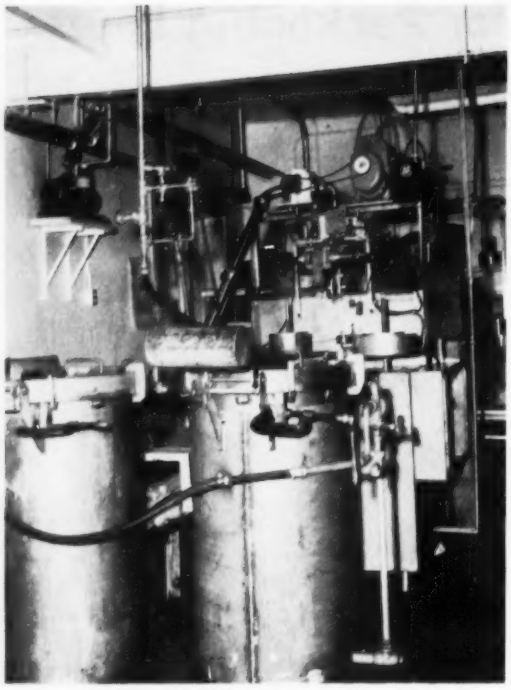
LEAK-PROOF corrugated carton has aluminum-foil lining and specially formed ends. Developed by Stone Container Corp., New York City, and Aluminum Co. of America, Pittsburgh. (79D)

SMALL DETECTOR electronically rejects any carton containing metal particle. Mounted on stand and equipped with belts, it's easy to install.—F. W. Brilmayer Labs., Inc., New York City. (79E)



SLIDING DOORS, horizontal and vertical, save swing-open space. Insulation is foamed into place inside metal shell. Doors have tight-fitting Neoprene seals.—Clark Door Co., Newark, N. J. (79F)

1 'SILENT CUTTER' gets 500-lb batches of blended, aged cheddars chuted from ribbon-type horizontal mixers on the floor above. Flavor, color, and other ingredients are added as the batch gets combination chop-mix.



2 SAUSAGE STUFFERS are coupled up (foreground) to continuously feed chub-type packaging machine (rear) for wrapping in colored Pliofilm. Stuffers may also be employed to fill crocks.

Giving "Extras" to Foods Pays Off

—Especially where you follow-through with the "techniques to fit." . . . Here's an outstanding example: Kaukauna's variety snack-spreads formulated from cheddars and prepared and packaged the sausage way

EARL A. GILLING and JOHN V. ZIEMBA

Executive Vice-President, Kaukauna Dairy Co., Kaukauna, Wis., and Associate Editor, "Food Engineering"

TO ASSURE SUCCESS with a new food idea, there's nothing quite so effective as a program that packs a 1-2 punch.

For instance, something extra added to an already-topnotch food will (1) give you real impact for winning a higher product demand.

Then the follow-up (2) is to establish it solidly by incorporating the most practical methods for processing it—drawing on all available ingenuity, wherever it may be found in the broad food industry.

Kaukauna Dairy Co., Kaukauna, Wis., did just that. It believed that even the choicest cheese could be made tastier, and proceeded to prove it by launching a new line of tasty cheddar tidbits—hickory smoked, appetizer, onion, garlic, and port wine. This sent demand soaring.

Then company studies determined that production techniques used by sausage-makers were the

most pertinent for handling these new items. And with these adopted, the new demand was met.

Down to Details

In Kaukauna's process, aged cheddars (70 to 75 lb.) are taken from a 36F. storage room and divested of their wax coatings. Then cured stocks of these cheeses, selected to produce the required blends, are loaded on trucks.

These cheddars then go into horizontal, 500-lb.-capacity ribbon-type mixers, where they are broken up and blended with such ingredients as milk solids, dextrose, etc.

Those are the major steps. Now, to come into focus on specifics of a particular item – the hickory-smoked product: Here, cheddars are cut into 20-lb. slabs for trucking on 8-shelf, perforated, portable racks.

Twenty of these racks are transferred to the smokehouse, into which cold hickory smoke is piped from a remotely located generator. After 24 hr. of smoking, product moves on to the ribbon-mixers, where it is blended for 15 to 20 min.

Batch is then discharged onto a portable belt conveyor that feeds a stainless steel, floor-level, hopper-type chute (16 in. by 20 ft.). This chute empties into a Boss chop cutter (known as a silent cutter to sausage-makers) on the floor below. Here, other ingredients are added to the batch.

Following a 10-min. mix, batch is removed at about 90F. and charged into a 500-lb. stainless steel bucket. It is then transferred to one of four 500-lb., pneumatically operated sausage stuffers.

Coupled pairs of stuffers continuously feed, through a stainless steel pipe, either a Kartridg-Pak chub packaging machine (FE Sept. '54, p. 77) or the stoneware-crock filling line.

For chub packaging, each machine automatically forms roll-fed Pliofilm into a heat-sealed tube that is filled with 6 oz. of product. Ends are then aluminum clip-sealed at a rate of 30 packages per minute.

Packages are check-weighed as they are discharged from the chubbing machines to a belt conveyor traveling to a double-tier cooler (30F.) located on the floor below. Here, product solidifies while making ½-hr. travel on 3x50-ft. wire-mesh belts.

Cooled link-style cheeses are packed 6 to a perforated carton. And these cartons, in turn, are packed 12 to a shipping case. Cases are held in a 36F. room, ready for shipment.

Filling into crocks involves adding 6-, 12-, 22- or 45-oz. amounts of product into stoneware containers at the stuffers. Girls then "top" the cheese with lightweight aluminum foil and seal with a rubber gasket and stoneware lid. —*End*

"Making It Still Better"

Good cheddar is A-1 as it is.

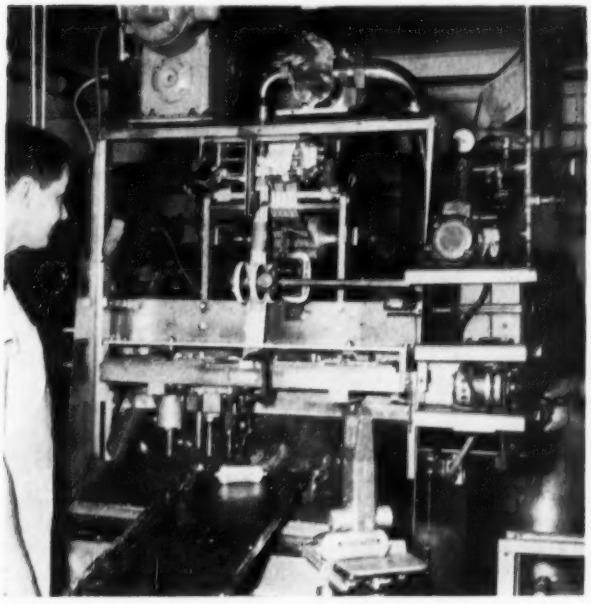
But this didn't stop Hubert Fassbender from making it still better.

He pressed right ahead to develop entirely new concepts in cheese flavors, adding other ingredients to produce a new specialty cheese food that won an immediate and enthusiastic reception.

This was the easily-spread Kaukauna Klub, put up in vary-sized stoneware crocks, with patent caps and seals.

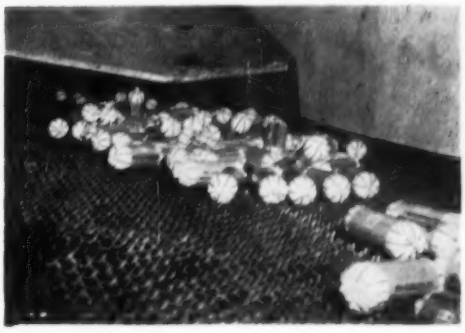
Later, the firm launched a package which had been unknown in the cheese field. This project involved packing the product in a transparent casing much like that employed for chub-style sausage items, tied at the ends, wax-coated, and cellophane-wrapped. And in this form there followed various new spreads—the hickory smoked, appetizer, onion, garlic, and port wine varieties.

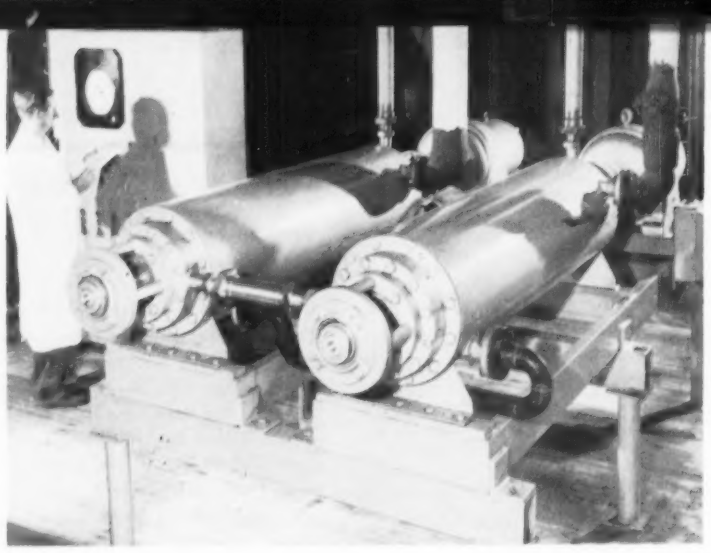
You'll get here the picture of how they're handled.



3 **PACKAGING CLOSEUP.** Product is run through positive pump to a tubular mandrel. At the same time, roll-fed Pliofilm is formed into a tube around the mandrel. Product fills tube and jaw sealer forms link-style units by squeezing ends. Aluminum clips seal the ends at 30 packages per min.

4 **PACKAGED PRODUCTS** are chilled as they are conveyed through double-deck cooler.





IN-LINE QUALITY CONTROL: Engineer (left) checks automatic operation of series-connected heat exchangers (10-in. dia.) that rapidly cool molten chocolate to precise temperature required for uniform crystallization of fat. Scraped-surface design of units, which handle some 13,000 lb. per hr., provides efficient agitation for speedy heat transfer and intimate mixing. Product temperature is regulated by sensitive 4-unit control system. Latter's recording-receiver is visible on panel at left.

This Precision Heat-Transfer Wins Sharpest Process Control

Equip an efficient heat exchanger with highly sensitive automatic controls—then you have a system that handles the tough heat-transfer jobs, like tempering of chocolate . . . Unit and operation detailed

J. C. MUSSER and D. LINEBERRY

Vice-President, Research & Development, Klein Chocolate Co., Elizabethtown, Pa., and Process Engineer, Votator Div., Girdler Co., Louisville, Ky.

CLOSE CONTROL of crystal formation in continuous product flow is an outstanding achievement of modern heat-transfer processing. And it has been made possible through an automatic high-precision temperature control system, coupled with an advanced heat-removal unit that pays off in many ways.

It took this combination of food-processing refinements to bring chocolate tempering to a new level of efficiency, the application being made by Klein Chocolate Co., Elizabethtown, Pa.

Through pinpoint control of heat-transfer variables, this processor is now cooling molten chocolate to the precise temperature required for uniform, fine-crystal formation (good temper)—thus is imparting excellent sheen and texture to his finished product.

Cooling takes place in a scraped-surface heat exchanger (Votator, Girdler Co., Louisville, Ky.) that provides intimate mixing so that every particle of chocolate attains the same temperature. And heat-transfer is regulated by a highly sensitive multiple control system (Taylor Instrument Cos., Rochester, N. Y.). Latter continuously adjusts the flow of constant-temperature cooling water in response to minute changes in product temperature.

But automatic control of process variables is not the only advantage of this equipment. It also offers:

1. High throughput capacity, with little holdup of material in process.

2. Rapid startup and changeover (5-10 min.), one item to another.

3. Optimum economy of floor-space.

4. Easy cleaning and maintenance.

Let us now see how this efficient unit handles very critical heat-transfer operations, as demonstrated in the tempering of chocolate slabs.

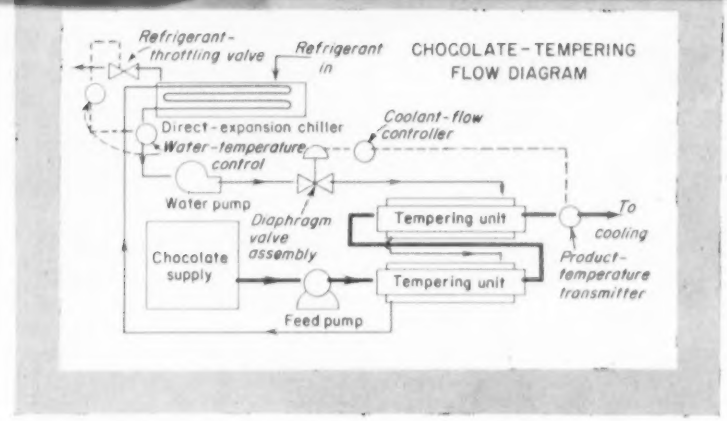
Why Temper Chocolate?

High sheen, sharp snap, and fine-grain texture in chocolate are the prime aims of "tempering"—cooling and crystallization of the fat (cocoa butter).

Exactly what occurs in this process is still somewhat debatable, but it is generally agreed that uniform crystal structure is a key contributor to good temper. On cooling, cocoa butter forms both stable and unstable crystals, the latter causing the grayish appearance (fat bloom) of poorly tempered chocolate.

A truly efficient tempering unit will rapidly cool the product to the desired temperature, and provide intimate mixing for uniform crystal formation.

This article describes just such a machine, along with its sensitive controls that regulate the cooling.—The Authors



SCHEMATIC shows counter-current flows of product and cooling water in tempering of chocolate for 10-lb. coating slabs. Constant-temperature water from chiller (top left) is metered into exchanger jackets by accurately positioned diaphragm valve, which is actuated by a minute variation from a pre-set temperature of discharging product.

As shown in our accompanying flow diagram, chocolate at 110-115F. is pumped through two exchangers (10-in. dia. by 62 in.) connected in series. Supply pump maintains a constant feed of some 13,000 lb. per hr., and cooling water at 40-45F. flows counter-currently through the machines' jackets.

An auxiliary control in the refrigerant line of a direct-expansion water chiller (upper left in flow diagram) throttles the flow of refrigerant, thus holds temperature constant.

Chocolate is cooled to proper temper in a single pass through the exchangers and discharges at 86 to 90F. (exact temperature depending upon the type of product). Tempered material is continuously deposited into pans for final cooling, then is packaged.

4-Unit Temper Control

Since both flow of chocolate through exchangers and temperature of cooling water are held constant, flow of coolant is the third variable that must be regulated for precise heat-transfer. And this is the job of the 4-unit control system.

As indicated in the control diagram, this system consists of a temperature transmitter, controller, receiving-recorder, and an air-operated diaphragm valve.

Here's how it operates:

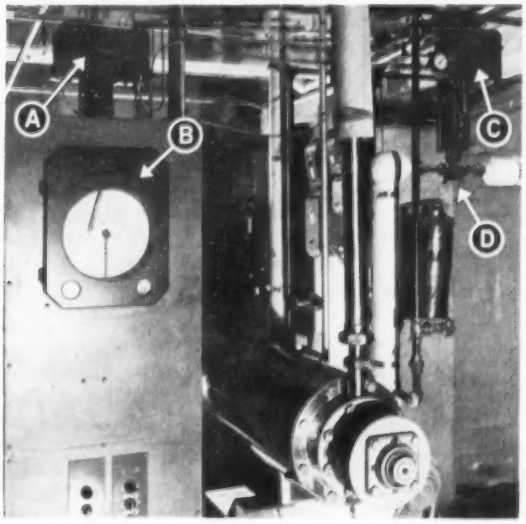
Product temperature is continuously sensed by the transmitter (Transaire), whose fast response enables accurate monitoring of minute temperature changes. It sends air-pressure signals to the controller and recorder (Transet), such signals varying from 3 to 15 psi. in direct proportion to the control range of the system, (75-125F).

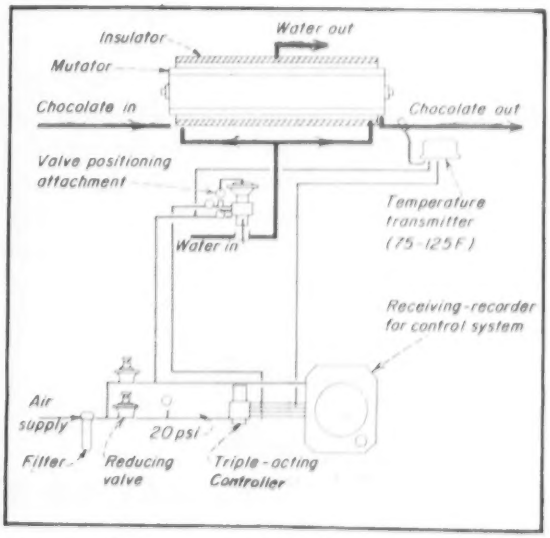
The receiving-recorder next converts these pneumatic signals to charted temperature readings. This unit also has an automatic-manual switchover station and a precise pilot-operated air-reducing valve.

For automatic operation, latter is initially adjusted to the desired control point (shown by set pointer on recorder). Reducing-valve output pressure also goes to the set-point section of the controller, which is a non-indicating, force-balance, pneumatic unit.

It receives and compares the two above-mentioned pneumatic inputs. Output air pressure from the controller then actuates a valve-posi-

Closeup of Compact Exchanger and its Heat-Transfer Controls





4-UNIT SYSTEM also controls flow of cooling water in this 6-in.-dia. exchanger (capacity 2,500 lb. per hr.). Tempering cycle controls are seen in photo. Transmitter (A), sensing temperature of discharging product, sends pneumatic signal to receiving-recorder (B) and to a controller (behind recorder). Controller compares these inputs, then sends correcting signal to positioning attachment (C) of diaphragm valve (D), which opens or closes as required. Right: Detail of control system shows location and interaction of components.

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tioning attachment (Precisor). This unit, fitted on the diaphragm valve, virtually eliminates lag for accurate control of flow in the cooling-water line. Magnitude of air-pressure signal is shown on a gage in the recorder.

Coolant Flow Critical

In response to controller output, this attachment accurately positions the diaphragm valve's disk to admit the required amount of coolant to exchanger jackets. A gage and bypass assembly on the unit permits selection of output, either from the unit itself or from the controller, for operation of the valve. Latter assembly also allows for making checks and adjustments of the unit.

If process air pressures do not coincide with the set-point figure, controller output changes to return the control to set point. Adjustable sensitivity of the controller permits throttling rather than on-off operation of the diaphragm valve. In addition, its automatic reset feature allows for return of control point to set-point value regardless of load changes, such as variations in water-inlet pressure and temperature, chocolate inlet temperature and flow rate, or buildup on heat-transfer surfaces.

The controller response feature (called Pre-Act) is a third advantage. It causes the control point to return more rapidly to the set point, following a load change, and minimizes the initial upset from the change.

Should the dual-switchover station be operated manually (rather than automatically as described), product temperature is adjusted by a hand setting of the reducing valve, which loads the diaphragm-valve attachment directly.

In general, control of heat transfer is materially simplified by the exchanger's internal design, which provides a high ratio of surface to volume of material in process.

Exchanger Details

Feed enters the machine through a passage formed by a rotating shaft and a heat-transfer tube.

Material is rapidly dispersed in passing through the annulus, which provides for rapid cooling to a uniform temperature and crystal size. Furthermore, spiral flow of coolant promotes a high jacket velocity and turbulance that boost heat transfer.

These factors permit high throughput with relatively small equipment. For example, a unit handling 2,500 lb. per hr. of chocolate occupies a space of only 15x8 ft. —*End*

← For more data, circle this page number on card at back

FULLY AUTOMATIC check-weighing system in action. Bags of flour (5-lb. size) move from single-spout filler (right) to selector (A), which whisks every 14th one onto scale (B). Just as speedily, bag is then put back on line. At same time, weight variations recorded by scale are scribed on visual strip-chart of weight calculator (C), which also averages and totals the readings.

CHECKWEIGHING AUTOMATED

General Mills' checking of package fill was good. Wanted, however, was something better—free from human error. And it's now been achieved with a foolproof system wherein every 14th bag is automatically picked off, scaled, then returned to the line . . . Visual scribing and 'over' and 'under' totalizing are features

J. W. SPEERS
Plant Manager, General Mills, Louisville

INCREASED COSTS of raw materials and finished products have focused considerable attention on the vital problem of putting package fills under the most accurate control possible.

Our company, accordingly, is constantly testing equipment and procedures to strengthen this control in its plants.

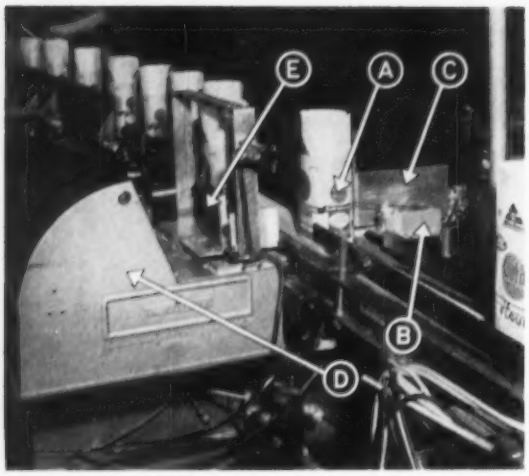
In specific point, here, is our progression (1) from outmoded scales to new checkweighing units; (2) from old-style fill-checking to a program of the efficient statistical quality control type; and finally (3) from manual handling of bags in our fill-check program to an entirely automated system.

Advanced units play roles in our latter stride. In order of their operation, the first of these is the selector which, at regular, determined intervals, automatically removes a bag from the line for check.

Second is our scale arrangement. This now incorporates means by which over- and under-weights are received and recorded by the third unit (see below). Meanwhile the checked bag is automatically returned to the line.

Third is the recording weight calculator, the unit which receives the weights from the scale. It not only scribes the specific reading on a strip-chart in view of the filling-machine operator but also gives the averages whenever five bags have been checked (see strip-chart illustration on next page).

In addition, it registers total number of packages



WORKING CLOSEUP of selector unit. Bag (A) trips Microswitch (B) to energize selector device. Then air-driven ram (C) pushes bag off belt onto scale (D). As weight of bag is transmitted to calculator (seen in first photo), a second ram (E) returns checked package to conveyor.

sampled during any given period and sums up the overages and shortages recorded.

Let us detail the story as it occurred: After replacing our worn checkweighing scales with new Exact Weight Shadowgraph models, we embarked on the statistical quality control program. This was set up at each plant to train both operators and management in the particular statistical QC methods and procedures involved.

Used here was a manual system wherein samples of filled sacks of flour from each line were checkweighed and averages and ranges manually graphed. It proved effective—in short, produced the specific results we wanted. And this system is still in use in a number of our plants.

Precise Check System

As in any system, however, there was room for improvement. A method involving manual performance is subject to variations of human behavior—with the manual statistical quality control technique no exception. It can be said that such technique is only as effective as those using it.

And so, we sought to improve upon manual statistical QC.

A few years ago, a recording weight calculator—the Datamatic machine—was developed by Scale Specialties & Systems, Inc., Roseland, N. J. It was designed to be attached to Exact Weight Shadowgraph scales used in most of our plants.

As already described, it strip-charts and totalizes, thus supplying both a "running visual" for the operator and the sum-up data covering working periods.

The strip chart (see illustration) is graduated by $\frac{1}{10}$th-oz. lines. The full chart width is 2 oz.—1 oz. on either side of the zero line that runs down the middle.

We first installed one of these recording weight calculators at our Louisville packaging plant. Mounted on casters, this unit was primarily used as a mobile "policeman," its "beat" being the 2-, 5-, and 10-lb. packing lines, where it checked results obtained by the manual statistical quality control method.

Automatic Sampling

Some months later, Scale Specialties & Systems developed its Random Sample Selector. This device enabled us to achieve the final step—automatic transfer of every 14th bag from the packaging line onto the scale platform. And after the bag is weighed, its automatically moved back onto the line.

Filling operator directly views strip chart from her working position (as she is seen doing in our first photo). Thus she immediately notes when weights begin to vary from normal tolerances. And accordingly she takes the necessary corrective action.

As shown in the photo, the Random Sample Selector device and Shadowgraph scale are spotted some 20 ft. farther along the packaging line.

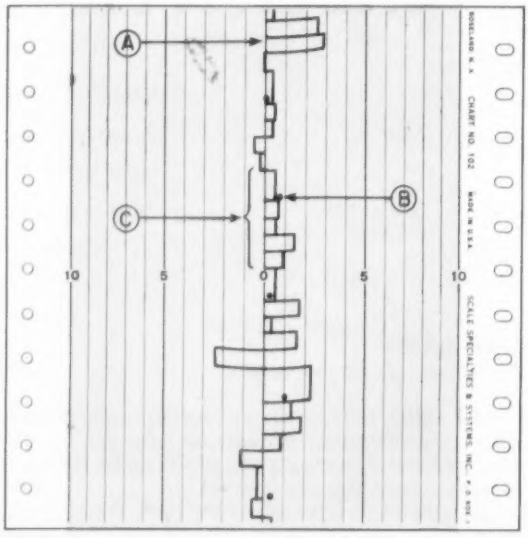
"Without Lifting a Finger"

Reception given this new technique by our production people has been most gratifying, for weights have been brought into even closer tolerance. Meanwhile the weight calculator continuously builds a good historical record of the weight performance on each production line it serves.

All is accomplished without the operator lifting a finger—not a single touch being needed during the checkweighing.

Following more than a year's experience with the new checkweighing system, we came up with these observations:

1. The weight calculator and sample selector are simple to operate and rugged enough for the opera-



PORTION OF STRIP-CHART, which is in constant view of operator. With $\frac{1}{10}$ oz. graduations, overweights are scribed to right of zero line, underweights to left. Strip feeds downward, so checks of latest bags scaled are seen at (A). Dots indicated 5-bag average. Thus, one at (B) reveals that bags bracketed at (C) averaged out at about $\frac{3}{10}$th oz. overweight. Note that scribing is double deep at every 5th bag (location of dot) to signify end of sampling sequence.

tions in flour plants. The calculator is foolproof and relatively free of maintenance, only requiring the usual periodic adjustments and balancing.

2. Production personnel quickly learn its use, and they have been found to prefer use of the new calculator to the former manual weighing and graphing of statistical quality control data.

3. The calculator eliminates erroneous weight reports.

4. Use of the calculator has confirmed what has been generally observed about operations of volume-fill flour packers: Uniformity of weights depends on uniformity of operation of the packer. And intermittent stopping and starting tend to widen the range and produce poor weight results.

Closeup of Off-On Cycle

Automatic transfer of flour-filled bags from package-conveyor belt to scale and back onto belt again is carried out in this manner:

Every 14th bag entering the selector device trips a Microswitch. This switch energizes a solenoid (set in case attached to the scale stand), which in turn trips a 28-toothed ratchet wheel with a pin mounted on 14th and 28th tooth.

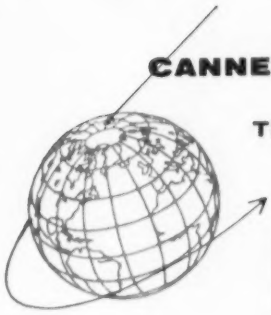
As the 14th bag moves the ratchet wheel, the pin triggers a solenoid air valve at the rear of the air-driven ram across the belt from the scale platform. The ram pushes the bag off the belt and onto the scale platform.

Instantaneously, weight of the bag is transmitted to the weight calculator and recorded. As the ram reaches the end of its stroke, it actuates another ram behind the bag adjacent to the scale platform. This second ram then returns the bag to the package-conveyor belt. Both rams then retract.

All these actions take place in a matter of seconds.

We might note that the specific unit we have described here is one among a number of good check-weighing machines now marketed. Our company does, in fact, employ in its various plants many of the other makes, and no endorsement of one over another is meant to be implied.

A word finally on the filler: it's a one-spout unit (Pneumatic Flour-Packer) that automatically weighs and trims to net weight. Normal operating rate is around 30 bags/min. on 5-lb. size. —*End*



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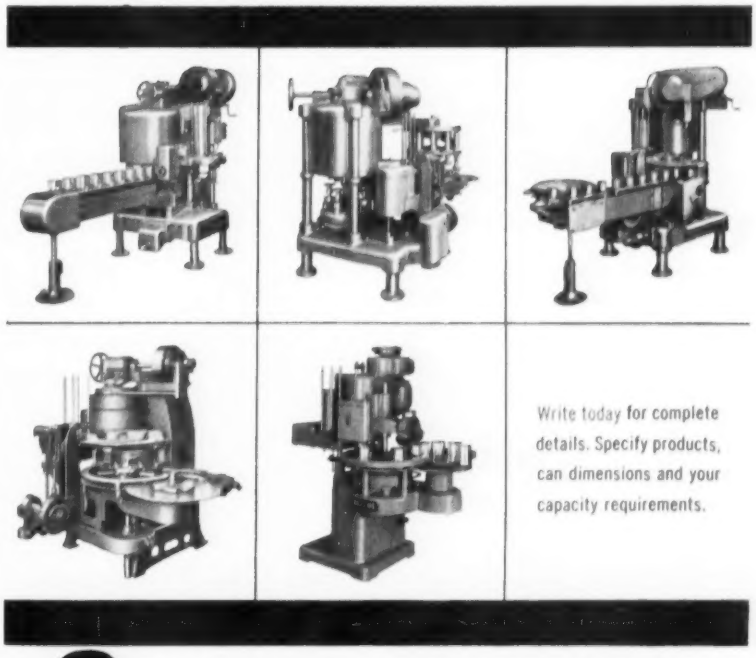

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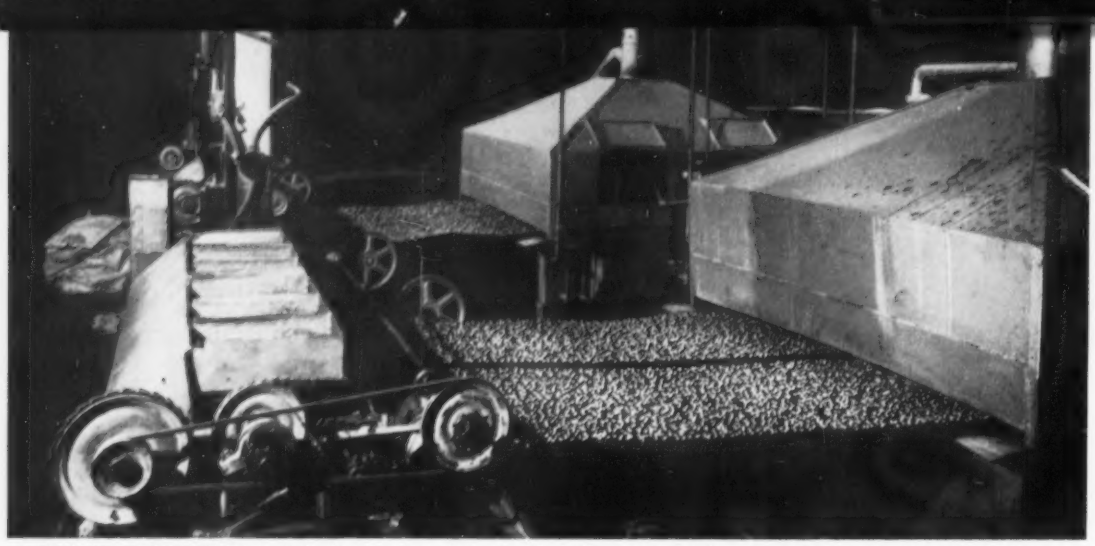


COMPANY PERSONNEL took leading hand in designing these lines. Extruded and cut (left), pretzel-bit dough drops on conveyors (center) that carry it through combination cookers-salters-oven (right) and on to toasters.

Tap Workers' Mechanical Knacks To Develop Specialty Machines

Quick design and fabrication of new food-production units was the need of this Indiana bakery. So it concentrated on hiring machinery-minded employees. And the idea worked out—in the form of new continuous extruders, cookers, salters, ovens, and toasters

C. S. BUDGE and JOHN V. ZIEMBA

President, Pretzel Bitz Corp., Bluffton, Ind., and Associate Editor, "Food Engineering"

COME UP with a new product, and chances are that you'll have to develop some of the machinery needed to manufacture it.

Therein lies a problem, particularly when your company is not blessed with a special-equipment engineering department.

But an unusual approach to special-machine design has now been successfully demonstrated by Pretzel Bitz Corp., Bluffton, Ind. The need was posed by problems entailed in making its small bits of toasted bit-size pretzels for cocktail, party, and TV snacks.

Here, the company adopted the policy of hiring mechanically skilled production personnel. Management reasoned that in this case it was easier and better to make bakers out of mechanics than mechanics out of bakers.

With this type personnel, several special process units were conceived, and to a large extent fabricated, in the company's own machine shop.

Among the new machines are dough extruders, caustic cookers, salters, combination gas-fired and infra-red ovens, oven conveyors, and toasters.

Roles played by these units in the company's stream-lined Pretzel Bitz production will be accented in the following description of operations:

On three lines, handling about 1,200 lb. of dough hourly, ingredients are sealed into three horizontal batch-type mixers (Day). After a 12-min. mix, 100-lb. batches of dough are charged into three of the company-designed extruders. Each of the latter units comprices six hoppers (6x6x12-in. size) with 6x12-in. augers feeding, under pressure, interchangeable dies.

Dough extruded through the die plates is cut to length by a reciprocating-type, single-bladed knife. Timing of this knife is adjusted to assure cutting of the dough into right lengths for the different snacks.

Dough pieces now drop onto a 5x50-ft. wire-mesh belt that carries them in a 15-min. travel through combination caustic cookers-salters-ovens.

Conveyors keep dough pieces submerged in mild caustic solution (190-200F.) as they carry them through the company-built cookers. Cooking seals the dough and produces the glazed surface.

Efficient operation of cookers is achieved through use of two 2x3x6-ft. feed tanks, from which caustic solution is pump-recirculated through two horizontal 3-in.-dia. pipes with 18 spray heads. Tanks are interchanged every 3 hr. for cleaning. This way, while one caustic

tank is being cleaned out, the other is in use. Moreover, more uniform shine is imparted to products due to the fact that dilution of caustic solution is minimized.

Automatic sprinkling of salt on pretzel dough coming out of cookers is carried out by still another company-designed unit.

The salters consist of V-shaped, 100-lb. capacity hoppers, with a single 3-in.-dia. corrugated metal rod below. Rotation of motor-driven rod is adjusted by a variable-speed drive. Stationary 1½-in.-dia. brushes over rods, and a pair of baffle plates (10-in.), set at a 45-deg. angle and below hopper discharge, direct a uniform flow of salt onto belt-conveyed pretzel dough.

Details of Ovens

The dough is baked in three 35-ft. ovens—also of company construction. Particularly noteworthy features of these compact, space-saving, patented units are:

1. Use of conveyor belts constructed of high-temperature-resisting steel alloy.

2. Double travel through oven on same conveyor to achieve more efficient use of oven heat. After completing its forward movement through the unit, the adhering pretzel dough then back-tracks in upside-down fashion on the return leg of the conveyor belt. And when it again reaches the front of the oven, a stationary plow scrapes the baked pretzels off the conveyors and onto a 10-in.-wide transverse belt. Adhering back-travel is accomplished by a special dough formulation befitting the metal of the conveyor.

3. Adoption of combination infra-red and gas heat.

4. Specially developed control systems for the eight automatic gas-fired zones to keep constant, uniform heat through each zone (pre-determined flow pattern). Temperatures are stepped down, zone by zone—from 600F. in first to about 300F. in final ones. Fuel is saved through use of natural gas.

Transverse conveyor belts from the ovens carry baked pretzels to still another company-made unit—a continuous, gas-fired, enclosed toaster. The pretzels feed onto a 4x40-ft., basket-type, wire-mesh conveyor that carries them into the 300F. toaster. Travel through the unit takes 30 min.

Coming out of the toaster, pretzels drop onto a 1x8-ft. canvas-belt conveyor. From here they are transferred onto an inclined, wire-mesh, flight-type cooling conveyor (6 in. wide by 100 ft. long) that elevates them into a 500-lb.-capacity hopper in the 2nd-floor makeup department above the packaging room.

An alternative is to convey the pretzels directly to five 750-lb.-capacity hoppers for gravity feed to separate packaging lines.

5 Packaging Lines

Here are brief descriptions of the company's five packaging lines:

1. No. 2 and 10 cans: Handled on a canning line equipped with a rotary 4-spout volumetric filler, single-head seamer, and wrap-around labeler. Speed: 50 per min.

2. Glass-packed items: On a line comprising a 4-spout volumetric filler, 4-head rotary vacuum sealer (Ball Bros.), and labeler.

3. Cellophane bags (5c. and 10c.) of Pretzel Bitz. Made up by Stokeswrap machine that forms, fills, and seals pouches at 35-45 per min.

4 and 5. Cellophane bags of company's variety items: Handled by two single-spout volumetric fillers.

Packaged products are conveyed to the end of the five separate lines, where they are packed into shipping cases supplied by company-built chutes. These are formed of metal—three 1½-in.-wide bars on two sides and single 2½-in.-wide bars on each of remaining two sides.

As for the above-mentioned variety items, these are a number of new pretzel-bit products featuring tomato, caraway, tangy cheese, bleu cheese, celery and onion, rye and caraway, and garlic and butter flavors. Also included are a similar variety of flavored pretzel sticks.

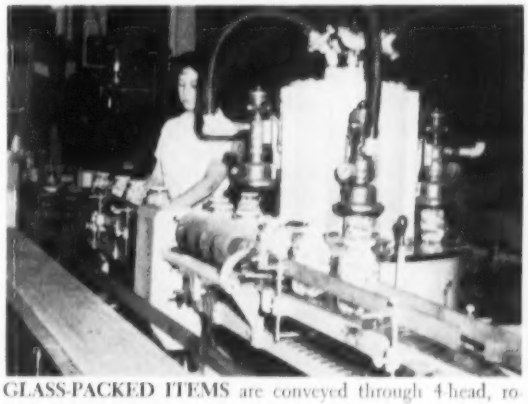
Plant Built "to Fit"

In constructing its modern 18,000-sq.ft. plant, the company particularly kept in mind the needs of the production department. Prior to actual building, complete floor layouts of machinery locations and product flow were furnished to the architect.

The plant's warehouse space is at floor-level and truck-bed height so that portable conveyors can be run into trailers for quick loading and unloading. Four trailers are spotted for receiving incoming materials—bags of flour, salt, malt, sugar, spices, etc.; drums of shortening; and packaging supplies.

From here, incoming materials and supplies are diverted to two locations: Ingredients go into a 5,000-sq. ft. holding room adjacent to the mixing area. And packaging supplies are conveyor-elevated to the second-floor makeup room, where boxes and cartons are staple-formed then fed, via the company-built chutes, to the packaging lines on the floor below. —*End*

Two Vacuum-Packing Lines



GLASS-PACKED ITEMS are conveyed through 4-head, rotary vac-sealer to extend product shelf-life.

ON THIS LINE, pretzel tidbits are filled and vac sealed at speeds up to 50 per minute.

Better Way To Measure Can Vacuum

Modified puncture-type vac gage proves more accurate. Also, it's cleaned easier and faster. And it doesn't clog

M. L. SEAMAN

Technical Service Division, American Can Co., Maywood, Ill.

THE PRIME TROUBLE encountered when measuring can vacuums is that ordinary puncture-type gages tend to introduce air into the can headspace when the container is punctured—thus causing variable errors.

Now, however, a modified puncture-type instrument—the Doudera-Seaman gage*—has all but eliminated such errors.

This has been accomplished with a special design incorporating a diaphragm that works to minimize such access of air.

Magnitude of the frustrating air variations depends upon the relation between internal gage and can-headspace volumes. And the differences have ranged from very small in a big can with large headspace to well over 50% in (for example) a small, well-filled baby-food can.

In short, it is apparent that greatest errors occur when measuring high vacuums in small cans, with these differences diminishing as vacuum drops or can size increases. However, the errors still are appreciable in smaller cans with low vacuums.

Now to the problem faced: When gage and headspace volumes are known, true can vacuum may be calculated from well-known gas laws. But seldom do we have both data. Hence, various techniques have been put forward to resolve the difficulty. However, the puncture-type gage has been only relatively successful, while other methods are cumbersome and inconvenient.

Acts Through Diaphragm

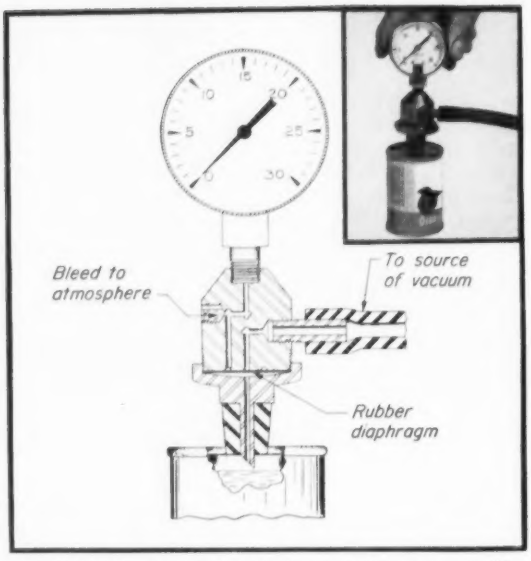
But with the new modified gage, errors due to introduction of air have, as stated, been reduced to very small values. What's more, operation with this gage is as easy and rapid as with the simple puncture unit.

True, there is need for an external source of vacuum. However, vac lines are generally available in laboratories associated with the canning industry.

Operation of the new gage is keyed to the action of a thin rubber diaphragm, arranged so that vacuums applied to top and lower sides are balanced. Top vacuum—from the external source—is applied via a central orifice. Lower vacuum is derived when the can being tested is punctured by the piercing stem.

A channel in the diaphragm support (see drawing) extends from an annular groove surrounding the central orifice to an ordinary vacuum gage. Thus, the latter is directly connected to the vacuum supply when the diaphragm is pulled down away from the support by can vacuum. A connecting bleed vents the gage to atmosphere.

When a can is punctured, the diaphragm is pulled down, and remains in this position until gage vacuum reaches can vacuum. At this point, the diaphragm moves up to seal off the external vacuum source, and the gage registers can vacuum.



HOW NEW GAGE WORKS is revealed by cutaway. Use of diaphragm assures measurement precision by nearly eliminating introduction of air into can headspace. Inset shows how instrument is applied to a can.

How New Gage Improves Accuracy of Readings

Calculated errors when employing ordinary puncture-type vacuum gage (5 ml. capacity) as compared with those when using new instrument, assuming cans with normal headspace volume and atmospheric pressure of 30 in. Hg.

True Vacuum (In. of Hg)	211x400 Size Can Error in Hg		202-214 Size Can Error in Hg	
	Ordinary Gage	New Gage	Ordinary Gage	New Gage
25	8.3	0.5	15.7	1.6
20	6.7	0.4	12.5	1.3
15	5.0	0.3	9.3	0.9
10	3.3	0.2	6.3	0.6
5	1.7	0.1	3.3	0.3

* Developed by Technical Service Div., American Can Co. Patented in the U. S., the instrument is manufactured by Wilkens-Anderson Co., Chicago.

the gage of the instrument then registers can vacuum.

The bleed then makes the gage vacuum drop, permitting the diaphragm to move down and again connect the gage to the vacuum source. This again evacuates gage to can vacuum, sealing it off from vacuum source to once more read can vacuum.

In actual operation, the drop in gage vacuum is very slight. And, for all practical purposes, the gage continues to register can vacuum, while the diaphragm describes a rapid fluttering action.

Minimizes Errors

Aside from possible errors of indication in the gage itself, the only error which might be considered of consequence is that from the same source as when using a regular puncture gage. In short, some air is still introduced into the can headspace.

But with the new instrument, this has been reduced to a mere 0.2 ml. (approx.), as compared with 5 ml. (using ordinary gage of that capacity).

Referring to our table, it will be noted that on 202x214 cans the error is but one-tenth of that occurring with an ordinary gage—ranging from only 1.6 in. at a 25-in. vac down to 0.3 in. at a 5-in. vac.

This error rapidly decreases as the can size increases. Thus, for the next larger can size (211x400) it runs only 0.5 in. at 25-in. vac down to 0.1 in. at 5-in. vac.—and then becomes smaller and smaller through sizes 300x406, 307x409, 401x411, 404x700, and 603x700.

In practical testing of vacuums in canned foods, such errors are negligible.

Clogging Curbed

Users of puncture-type gages are familiar with the tendency of food materials to be drawn into the gage after a can is pierced and its vacuum released. This is especially true with small or over-filled cans. And often, under these conditions, the gage may fail to operate.

However, such clogging with food particles is reduced in the new instrument because of the smaller amount of air drawn back into it after each measurement. Moreover, the Bourdon tube of the vac gage never clogs, since the diaphragm isolates it from the puncturing point.

Overall, the instrument is particularly designed to permit easy and rapid cleaning. —*End*

HAMILTON
STAINLESS STEEL KETTLES

JUST think! Over three quarters of a century building fine cooking and mixing kettles for industry. These quality units, engineered and designed by the finest craftsmen, insure higher efficiency, labor-saving and cost-saving operation. There's no substitute for the best—"Hamilton." When it comes to mixing, the agitators, the drives are designed for longer life and these rugged sanitary units have proved themselves in operation. The Steam-Jacketed Kettles are fast-cooking, easy-cleaning, precision-built.

If it's the best you want—then you want "Hamilton," the foremost designers and producers of the finest kettles to mix and cook. There's a "Hamilton" to suit your specifications so why settle for anything but the best, a "Hamilton" Stainless Steel Kettle.

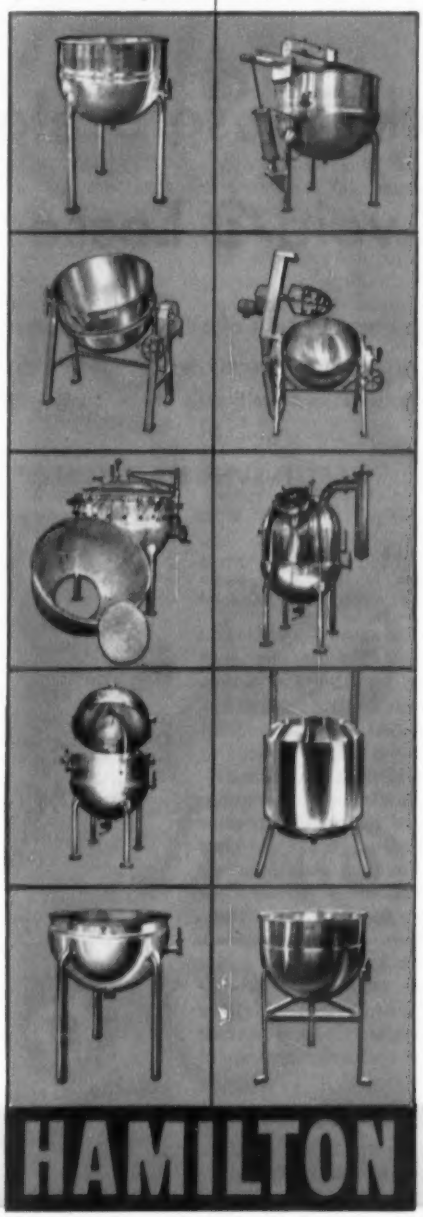
STYLE SA
Streamlined design, balloon gasket. Extra large diameter provides greater heating surface, efficient cooking. Sizes range from 15 to 500 gallon. A.S.M.E. Code constructed for steam working pressures of 40, 90 and 125 pounds.

STYLE CW
Designed to process large batches up to 150 gallons. Positive worm gear and handwheel give complete control of large capacity loads while tilting. Large diameter kettle gives fast, even cooking. Sizes from 30 to 150 gallons.

STYLE PC
Stainless steel pressure cooking kettle, designed especially for meat and poultry processing. Balloon jacket gives increased heating capacity. Built for 90 p.s.i. in jacket and 15 p.s.i. in kettle. Has quick opening latches. Top is lifted by eccentric lever. Sizes 30 to 250 gallons.

STYLE VT
For small batches this unit has no equal. Vacuum cooker with tilting top, easy loading. Sizes from 30 to 150 gallons. Sanitary design throughout. Jacketed for 90 p.s.i. steam working pressure.

STYLE SB
Shallow type kettle with balloon jacket. Streamlined for complete sanitation. A.S.M.E. Code constructed for working pressures of 40, 90, and 125 pounds. Sizes range from 15 to 350 gallons. Larger size kettle can be furnished to meet specifications.



STYLE SA MIX COOKER
Standard SA Mix Cooker has either single motion or double motion agitator with or without hydraulic lift. With hydraulic lift agitator lifts easily and smoothly out of cooker. Sizes range from 30 to 500 gallons.

STYLE CW MIX COOKER
Large diameter gives fast even cooking. Hydraulic Lift tilts agitator smoothly and easily out of tilting kettle. Available for 40, 90, 120 pounds steam working pressure.

STYLE HV
A vacuum cooker for large capacities from 150 to 500 gallons. A hinged manhole is provided for access to the inside. Available with a mixer — circulator can be installed to increase heat transfer and agitation.

CIRCULATOR
Stainless steel steam immersion heating unit can be installed in any kettle regardless of size or shape. Gives extra heating surface at the center of kettle. Creates thermal agitation. Speeds up cooking 45%.

STYLE A
General purpose steam jacketed kettle used in processing food, drugs, and chemicals. Full ½ jacketed. Sizes range from 15 to 500 gallons. Also available in Type 316 stainless steel or nickel. Larger sizes to meet specifications.

KETTLE SPECIALISTS

HAMILTON

SINCE 1876

DIVISION OF BRIGHTON CORP.... 820 STATE AVENUE ... CINCINNATI 4, OHIO

For more data, circle this page number on card at back →

RIGOROUS TESTS are applied to scales by manufacturer before shipping, thus assuring accuracy and sensitivity. But wear and misuse can rapidly change this perfection and lead to large scaling errors. To maintain original perfection, processors should initiate a faithful program of inspection and tests—performed by a qualified mechanic.

Check Those Scales To Avoid $ Losses

Weighing devices get "out of kilter" oftener than you think. But this testing program—complete with step-by-step tips on finding and fixing malfunctions—will stop those scaling errors

PART I—EVEN-BEAM SCALES*

EDWARD P. LEE

Technical Assistant to Director of Manufacturing & Engineering Dept., General Foods Corp., White Plains, N. Y.

PROFIT OR LOSS in any food manufacturing operation is closely tied to weight-measuring devices. For ultimately, almost every ingredient that goes into a food product is bought and sold on a pound basis.

With this in mind, you can realize the urgent need for perfect accuracy in these measurements. A slight error in a truck or railroad scale handling tons of raw materials per day can quickly add up to hundreds or thousands of pounds—and a corresponding loss in dollars.

There's just one way to prevent such a situation—regularly scheduled scale tests, conducted by a trained mechanic who can make repairs.

How Schedule Tests?

When setting up such a schedule, the following five points should be considered:

1. Scale tests do not guarantee future accuracy. Scales have been known to develop errors only hours after a test. However, proper tests do give proof that small errors are not developing into large ones, and that the scale will probably function accurately until the next testing period. Examination can also uncover the need for immediate mechanical attention or adjustments.

2. Testing periods vary for different scales. In general, scales for rough weighing should be tested every three or four months. Scales used for weighing heavy ingoing and outgoing materials should be checked every month. Those used in weight-control applications should be tested weekly or daily, depending on the precision needed and the type of scale being used.

3. Never assume that a scale is accurate. Always presume that it is out of order, and make it prove itself through tests with sealed, standard weights. A further caution: Be sure that these standards are accurate. Any large scale-manufacturing company will check your standard weights and correct any errors.

4. Use the correct number of standard weights. Always test a scale at either half-capacity or at a weight beyond the normal load (whichever is greater).

5. Commonest scale error is in zero balancing. The greater the sensitivity of the machine, the more frequently this balance point will get out of order. Checking this point is not just the responsibility of your scale mechanic. Every operator should know how to "zero-out" his scale, and it should be routine in his daily duties. If very high accuracy is required, this balancing check should be performed for each series of weight increments used.

Testing Vs. Inspection

Scale testing is a relatively simple operation that can generally be performed without taking the scale into the shop, and is aimed at checking accuracy of measurement.

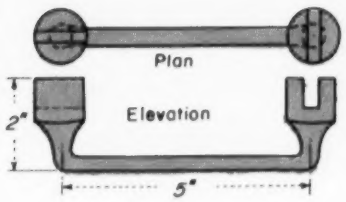
Inspection, on the other hand, usually implies dismantling of the scale to find the cause of any trouble discovered during the test examination.

For the latter, there are certain special tools and pieces of equipment that are essential.

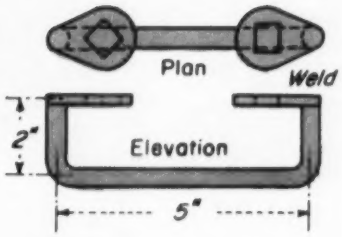
First, a repair shop must be provided. It should measure at least 10 ft. square, and be located away from heavy traffic areas.

This shop should be equipped with a substantial workbench and a good 2- or 4-in. machinist's vise. Also essential: Coarse grain (Grit 54) and fine grain (Grit 150) emery wheels. The fine wheel should be kept exclusively for scale work. A 1x6-in. buffing wheel and fine buffing rouge should also be available. And a per-

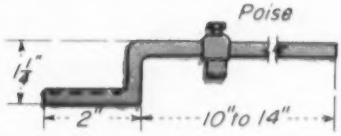
* Parts II and III, scheduled for forthcoming issues, will cover testing and repair of other commonly used scales.



YOU CAN MAKE this wrench for adjusting Fairbanks scales. Use $\frac{3}{8}$-in.-dia. drill rod. Cut handle down to $\frac{7}{16}$ in. in lathe before bending ends. File in $\frac{1}{4}$-in. openings. Water-harden and draw to a dark blue in tempering.



THIS WRENCH fits Howe scales. Bend $\frac{7}{16}$-in. handle first, then weld on $\frac{1}{4}$x$\frac{3}{4}$-in. flat-stock plates with $\frac{1}{4}$-in. square holes. One hole should be square with handle, the other at 45 deg. Water-harden, draw to dark blue temper.



SCALE FEELER GAGES are made of $\frac{3}{4}$x$\frac{3}{32}$-in. flat-steel ground stock. Weld or braze angle connections. Sliding poise must be very true for accurate settings. Cut-edge of poise should be level with cut-edge of angle extension. Use a fine, round file to form the four, knife edges, then make notches with a sharp cold chisel (edge same angle as pivots). Dress burrs with fine emery.

fectly flat table is desirable for testing small scales. Put it in a clear area so mechanic can move all the way around it.

Finally, adequate storage space and cupboards should be installed for parts and supplies.

Standard weights should be available for checking scales. For the average plant, the following four types of weights will suffice:

1. Handle weights: For scales handling over 500 lb. They are made in 50, 25, 10, and 5 lb. sizes. Enough 50-lb. weights should be on hand to equal capacity of the largest scale being tested.

2. Knob weights: Used for small scales. These are usually boxed in sets and are available in metric or avoirdupois measure.

3. Fractional weights: For testing analytical balances.

4. Nest weights: For medium-sized scales. They are available singly or in sets (avoirdupois or metric measure).

Handle the test weights as little as possible to avoid chipping them or loosening the lead seals. Also have your weight standards, large or small, checked regularly by a scale manufacturer.

Special wrenches are needed to adjust nose-irons in platform scales. These are easily made in your plant (see diagram). A scale feeler gage is also a necessity (see drawing). These are not sold, it seems, but should be because of the precision required to make them.

Testing Even-Balance Scales

Because of the similarity of the three main types of even-balance scales, they can all be tested with the same procedure. On each of these scales, platters (weight and/or load platforms) are above beam. Platters travel vertically by means of the parallelogram created by beam, check rods, and platter stems. Accuracy of this parallelogram must be checked.

Here's the test procedure:

STEP 1: If scale has a balance ball, balance scale by moving this ball toward or away from the fulcrum.

If there is no ball, scale is balanced by lead pellets in a lead pot. Unscrew platter from its stem and add or subtract lead pieces until scale zeros.

STEP 2: If scale swing is jerky on a machine without an oil dash-pot, there is friction in some scale part.

Where a dash-pot is installed, oil plunger can usually be adjusted to increase or decrease swing. Normally, it should be regulated to permit three repeated swings. And indicator should return to zero when either platter is held down and then released.

To test for friction in this type of machine, hold each platter down in turn, then release slowly. If friction is present, indicator will favor the side that was held down.

STEP 3: To test beam accuracy on double-platter scales, secure two pairs of matched weights—one pair of, say, 1 or 2 lb., the other pair equal to double the load normally handled on the scale. For uneven-arm scales, a single weight equal to maximum value of the sliding poise is required.

Place a single weight in the center of each platter. Scale should read zero. When weights are switched to opposite platters, reading should remain unchanged. If an error is found when weights are switched, arm length on one side of the lever differs from the other (knife-edges have different spacing). However, if the error follows one particular weight, then the two weights are not equal. Exchange weights about four times to prove accuracy.

STEP 4: To test pivot accuracy, shift weights from side-to-side on the platters (perpendicular to the direction of the scale beam). If this shifting of weights causes an error, pivots are not spaced correctly. Pivot may be badly worn or may have loosened and turned. Pivot-spacing adjustment is a shop job.

STEP 5: Check trueness of the beam parallelogram (double-platter scales have two) by shifting weights from end-to-end on the platter (parallel to beam axis). Any error indicates wear or a change in accuracy of the parallelogram.

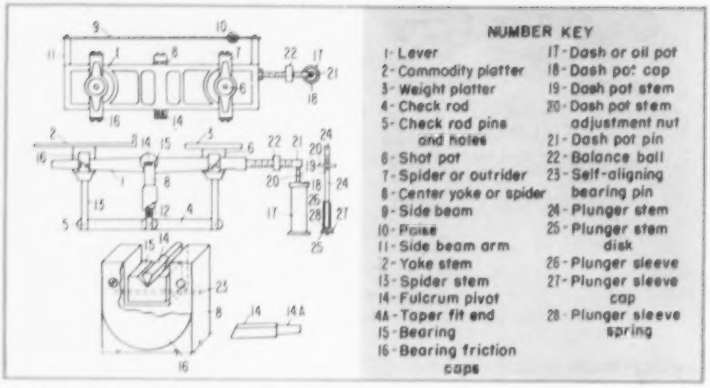
STEP 6: Accuracy of the sliding poise should be gaged next. Use a weight that is one-half the capacity of this side beam. Then double the weight and test full capacity. If the poise is in error, scale needs repair.

STEP 7: Now, test accuracy of the indicator (on over-under scales). If over-under graduations are marked with weights, place test weight on first one platter, then the other. Overweight amount will be indicated when weight is on the commodity platter, underweight on the weight platter. Allow some tolerance—about $\frac{1}{4}$ of a graduation. Any greater error should be repaired.

If chart graduations are unmarked, then scale is intended only for zero balancing.

Repair of Balance Scales

When errors are discovered during the tests, scale must be taken to the



SCALE PARTS (mentioned in tips on repairs) can be checked on this diagram, which details construction of a common even-balance weigher.

shop for repairs. Here's a run-down on faults discovered in each of the test steps, and their correction:

Off Balance, Poor Swing (Steps 1 & 2)

Friction generally causes off-balance and poor swing in scales. It shows up as bright, worn spots on parts, and stems from dull pivot edges, worn or cut friction caps, worn end-points on pivots, or binding in check rod, oil dash-pot, or indicator.

Dull pivot edges should be honed or ground to a sharp edge. But replace old, worn out pivots with new ones. To gage excess wear, stretch a string between edges of the end pivots. If string touches edge of fulcrum pivot, they are all right. If string does not touch all three, beam is over-range and will have a poor swing.

Worn or cut friction caps should be replaced if cap does not have an adjustable plug. If there is a plug in the cap, grind off any cut marks. Cap should be adjusted to permit $\frac{1}{64}$-in. play on either side of lever.

Worn end point on pivot can be ground off on a wheel while still in the lever, then touched up with a hand hone. New point must meet the pivot edge exactly, and friction caps should be re-adjusted for correct play.

Check rod is probably binding if it has little side-play. Binding is usually caused by turned or bent platter-stems. The pin-connection between rod and stem should have $\frac{1}{64}$-in. play.

Binding in oil dash-pot can be checked by disconnecting it from scale. If this corrects error, oil pot is at fault. Sticking can be fixed by cleaning out pot and polishing the inside with steel wool or garnet paper. Be sure plunger travels up and down in cylinder without rubbing sides. Adjust oil-pot stem-nut until scale makes three full swings before coming to rest.

If indicator stem binds, it is probably rubbing on tower housing, glass, or chart. It can be gently bent back into shape.

Unequal Pivot Spacing (Steps 3 & 4)

Gage pivot spacing by holding a check rod against the pivot-point ends to see if the pivot points match centers of the check rod holes. If spacing is uneven, return scale to manufacturer for a repivoting job. This operation calls for special tools, know-how, and extreme care.

Parallelogram Errors (Step 5)

When weights placed on either end of the platter show the same error, but a different one when they are placed in the center, wrong-length check rods or worn check-rod holes are the cause. The cure is simple—new check rods.

But when the weight shifts shows a plus error on one side of the platter and a minus one on the other, fault lies in wrong length between the "V" in the bearing block and hole in the platter stem. The distance may have been changed by a resized or reset bearing.

To correct, lengthen or shorten stem as required. This adjustment is easy if stem is threaded into spider. If it is pinned, however, pin must be driven, stem moved, and pin hole re-drilled. The center stud or stem may also have to be raised or lowered.

An agate bearing with a $\frac{1}{64}$-in. cut at the bottom of the "V" will cause a bad shift on the platter. Here, agate should be replaced, and bearing carefully reset.

Errors in Poise (Step 6)

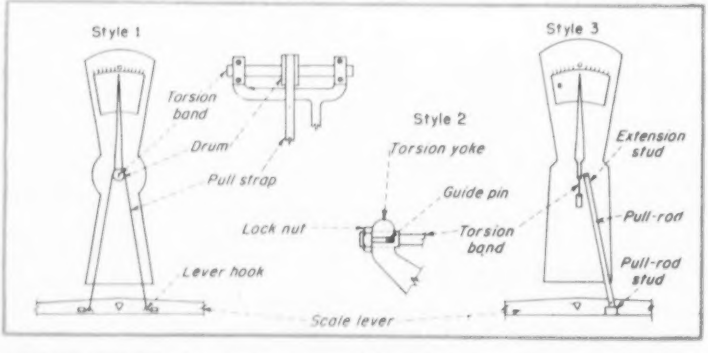
If sliding poise rests on an unnotched beam, make sure it registers zero when scale is in balance. If it doesn't, build up part of poise that butts against stop, using solder, weld, or threaded plug.

Now rebalance scale and test poise by sliding it to largest graduation. If it's heavy, remove filler lead. If light, drill a small weight in poise and fill it with lead. Here, drill and punch should be the same size.

If poise rides on a notched beam, errors are caused by worn notches. They should be filed sharp with a "V" or saw file.

Errors in Indicator (Step 7)

On, over-and-under scales, accuracy of the plus-and-minus indicator



THREE STYLES of torsion mechanism for indicator measurement are revealed in this schematic drawing. Note stressed torsion band in each application.

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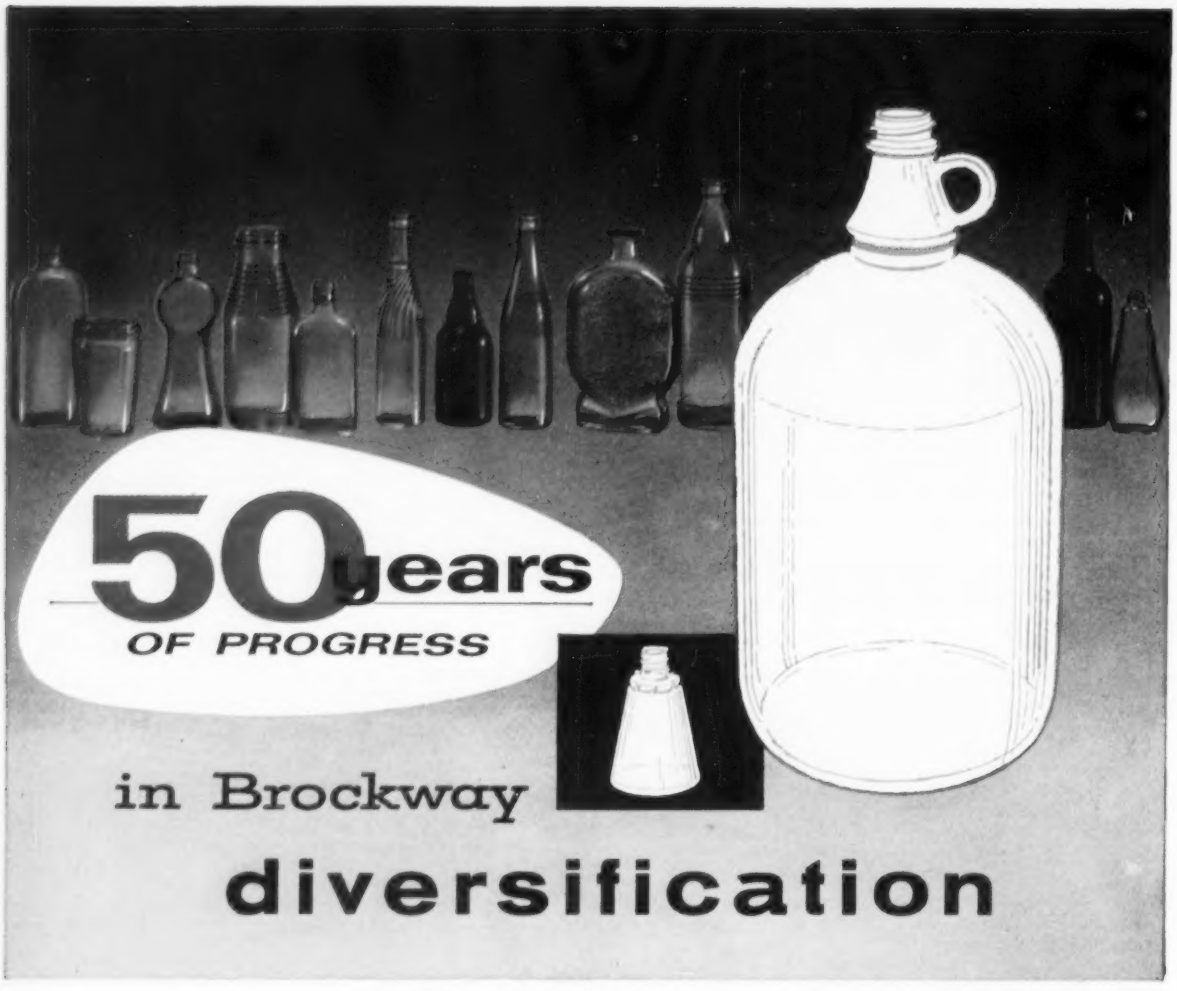

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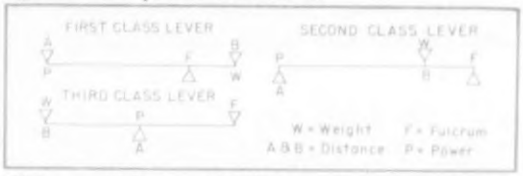
Principles That Every Scale-Man Should Know

MULTIPLICATION is built into many scales for the convenience of the operator. Using this principle, fulcrum is shifted on the weighing lever, or several levers are combined, so that the operator can weigh a large mass with relatively light counterweights.

In all three classes of levers (see diagram) the multiple is determined with this formula:

$$\frac{AF}{BF} = \text{scale multiplication}$$

Said another way, when distance between load and fulcrum (BF) is divided into distance from fulcrum to tip pivot (AF), the result is the multiplication of the lever. Where several multiplying levers are used, multiply their individual multiples to get total multiplication of the scale.



When multiplication is built into a scale, it must never be changed. The wear that results from rust, abuse, and use may change the supposedly fixed distances—and multiplication changes.

To regain true value, knives should be sharpened and reshaped, and nose-irons readjusted. For unless multiplication is held to the true value, the standard counterpoise weights (accurate test measures) will not work on the scale.

Scale levers increase or decrease force or pull of an applied weight. When a series of levers is connected, force applied on main levers can be greatly changed at the last lever—the scale beam or dial.

In knife-edge scales, levers have three knife points where loads are applied. They are called:

1. Fulcrum pivot: Knife-edge about which the lever turns.
2. Weight or load pivot(s): Knife-edge(s) receiving the load.
3. Power pivot: Knife-edge used to transfer weight from one lever to another lever in sequence.

For correct weighing, lever pivot-edges must be maintained in a true, straight line. This necessitates building a calculated bend into the beam so that pivot line is retained under heavy loads.

SUBSTITUTION TESTING

Few companies keep enough test weights on hand to measure the accuracy of heavy-capacity scales. But if 250 lb. of sealed, accurate test weights are available (a minimum requisite for any company), scales handling many times more weight can be tested by means of the following substitution method:

STEP 1: Place 250 lb. on scale platform and note reading (Example: Say scale registers 251 lb.). Then remove weights.

STEP 2: Using some convenient material (such as sand or the like), build up load on platform until 251 lb. registers. There is now actually 250 lb. weight on the platform.

STEP 3: Add the 250 lb. of test weights. Say scale now reads 502 lb. (a multiplying eror). Remove test weights and build load to a reading of 502 lb. with the granular material (you have actually added 250 lb.). This alternation can be continued until full capacity of the scale is reached and tested.

However, it is never wise to adjust the scales with a substitution test. If this approximation discloses a major error, obtain a sufficient supply of sealed, test weights to measure the deflection accurately.

Also, since the substitution test is subject to some error, never substitute more than four times the weight of the accurate test blocks.

An even closer way to perform the substitution test is with sealed, liquid-tight drums filled with water. These should test exactly the same as the 250 lb. of sealed weights—and can be held intact for an indefinite period.

USE OF OIL OR GREASE

If oil or grease are applied on small scales, dirt and dust will accumulate and in time parts will become sticky—leading to weighing errors. In fact, oil in the bottom of V-bearings can cause errors of from four to ten graduations on the scale.

But sometimes these small scales are used in damp locations. Here grease must be used to prevent corrosion. It should be applied thickly to all operating parts. At the first suspicion that it has become sticky, old grease should be completely removed with a solvent cleaner and fresh grease applied. Grease outside parts of these scales, also, to prevent rusting.

Wagon, truck, and railroad scales are generally located in pits—and thus, are very open to corrosion. They should be both oiled and greased.

First, apply a small amount of No. 30 oil. Then pack on grease at once. Grease should never be less than 1-in. thick, because a heavy layer of grease will stay pliable for six to eight months. Grease the lever system with a ¼-in. layer. Wash off old grease with a solvent and repack at regular intervals. Postpone final scale balancing until after fresh grease is applied.

---

is corrected by changing stress of a torsion band, or adjusting flexing strength of vertical ribbons within the tower.

There are three types of torsion-band scales: The first uses a ⅜-in. steel band (.006 to .008-in. thick) that passes through a drum. It is pulled tight and clamped at both ends. A pull-strap passes over the drum and is fastened to the scale lever at both ends with hooks (see diagram).

Accuracy of indicator is governed by a combination of torsion stress, and distance of lever hooks from the fulcrum.

The second type—which permits much more accurate regulation—contains an adjustable, threaded wedge for applying tension to the band.

The third type employs a vertical torsion band, which is flexed by a pull-rod attached to the scale beam. Readings are changed by lengthening or shortening flex distance and by using a torsion band of different thickness or width.

Some scales, however, have horse-shoe-type springs for controlling indicator action. Here, corrections are made by adjusting the loop springs a little bit at a time and observing results.

Much more exact adjustments can be made on scales employing the torsion principle than on those using horse-shoe springs.

This series is from "Service Manual for Industrial Scales," published by General Foods Corp., White Plains, N. Y. Copies are available from GF at $3.50 each. Check should accompany order. —*End*

Building Insulation Life Into Refrigerated Units

Proper erection procedures and optimum moisture content of lumber are essential to satisfactory performance on part of insulating materials. With certain soils, no insulation is needed in floors. But it's still good insurance, particularly with provision for heating the soil

CONCLUDING PART II—CORKBOARD, WOOD, REDWOOD FIBER, REFLECTIVE INSULATIONS, AND FLOOR CONSTRUCTION TIPS

EDWARD SIMONS
Consulting Engineer, San Francisco

OF PRIME IMPORTANCE in the building of refrigerated structures are such materials as corkboard, lumber, redwood bark fiber and aluminum, and proper floor construction.

Also vital are a carefully applied vapor barrier that precludes moisture accumulation in the insulation, and adequate density when fill type products are employed (Part I, FE Feb., p. 118).

Test Show Corkboard's Value

For many years vegetable corkboard, properly manufactured and installed, has held a noble position among insulating materials. That this is justified was demonstrated by several in-place tests conducted last year.

One installation was a wood framed structure built in 1949 in which 7 in. of corkboard was employed. Two layers of barrier paper had been placed over the wood sheathing.

In this type construction, asphalt does not bond to the basic structure. Nails are the only means of tying the insulation to the building. It is customary to use two nails per sq. ft. in the walls, and three in the ceiling.

Fig. 7* shows cross-section of wall and conditions at test points. Tabulations for high samples H-1 and H-2 and for low samples L-1 and L-2 give density, moisture content by weight, value of Munters' increment,[1] a value of thermal conductivity k_H or k_L based on moisture content, and a mean value for k_L or k_H determined by the reciprocal of the sum of resistances of sample prorated over total test wall thickness.

Effect of Moisture Content

Thermal conductivity of corkboard increases as volume of moisture in sample increases. Percentage of moisture by volume (ΔV) may be computed from percentage by weight as follows:

$$\Delta V = \frac{\rho \Delta W}{62.5}$$

where ρ = dry density, lb./cu. ft., and ΔW = % moisture by weight.

Munters increment Δk is an increase in the thermal conductivity k of 0.056 Btu./hr., sq. ft., F./in. for each 1% of moisture content increased by volume. Therefore

$$\Delta k = \frac{0.056\ \Delta W \rho}{62.5} = \frac{\Delta W \rho}{1120}$$

Heat Meter Tests

Meters were placed in the high and low positions, with interior ones over Portland cement plaster and exterior ones over the wood sheathing. In computing thermal conductance, established values of conductivity for plaster and wood were used. Test position was near a doorway, since other surfaces were inaccessible. Distance from door framing was sufficient to preclude influence due to lateral heat leakage.

During frequent door openings, condition was very unstable. Furthermore, water defrost of the coils resulted in a high heat input into the walls, which then flows into the insulation. The heat flow then reverses, and is pulled out after a long period of unsteady heat transfer.

It is important to note that there have been many failures of insulated structures due to pressures developed during defrost. If a coil mass is rather heavy with respect to the space, a large amount of heat is stored in it during defrost. Starting of fans rapidly transfers this heat to the refrigerated space, with a consequent rise in pressure if relief is not provided by such means as opening doors.

Also, defrost vapors will add to partial pressure of the air unless they are isolated. Results of these tests indicate that defrosting heat loads may be higher than ordinarily visualized, realized, or hoped.

Tests were finally run during night periods, and satisfactory cycling of the k_i value was obtained. Mean of thermal conductivities for outer and inner meters was then determined for each case. Mean meter values were within 10% of values determined from the moisture content and Munters' increment. Basic value

*Figs. 1 through 6 appeared in Part I (FE, Feb.).

WHEN CORKBOARD is dipped in hot asphalt, then properly applied and protected from moisture penetration, its high insulating value is retained over long periods of time.

for the conductivity was taken at 0.26; and Munters' increment was applied to that value.

Asphalt Is Effective Barrier

The rather surprising moisture content in the outer layers of insulation is undoubtedly due to nailing effect in the sheathing. The release of nail holding power is evidently sufficient to allow infiltration of moisture plus some convection.

Where asphalt barrier was heavy at the high meter position, inner 3 in. layer of cork was quite dry. Outside of the heavy layer moisture content ran close to 25% by weight.

In the lower position, asphalt bonding inner layer of cork was lighter, and moisture content was considerably greater than that of the higher sample.

Moisture content of exterior 4 in. of cork was less in the lower position, evidently due to the fact that the lighter asphalt layer allowed moisture to proceed through with less of a vapor dam effect.

Comparisons between moisture method and meter system of determining conductivities show values of 0.32 and 0.35 in each case. However, where this value applies to meters at one socket, it applies to moisture method at the other. This is pure coincidence, and is not an interchanging of values.

Shortly after the above tests, a moisture sample check was made on 4-in. walls which had been in service 28 yr. Heavy asphalt finishes protected inside and outside surfaces. Corkboard was a heavy density type weighing approximately 14.5 lb./cu. ft.

Average increase of weight in this wall was 1.1% due to moisture, and the Munters' increment average was 0.03 Btu./hr., sq. ft., F./in. The room had operated in variable service at temperatures from 40 to 100F. This excellent record indicates the high value of this material when properly protected from moisture.

Wood Should Be Seasoned

Wood is a very important construction material, with an insulating value from 30 to 40% of that of commonly used insulating materials. Thermal conductivities in Btu./hr. sq. ft. F./in., of two species are:

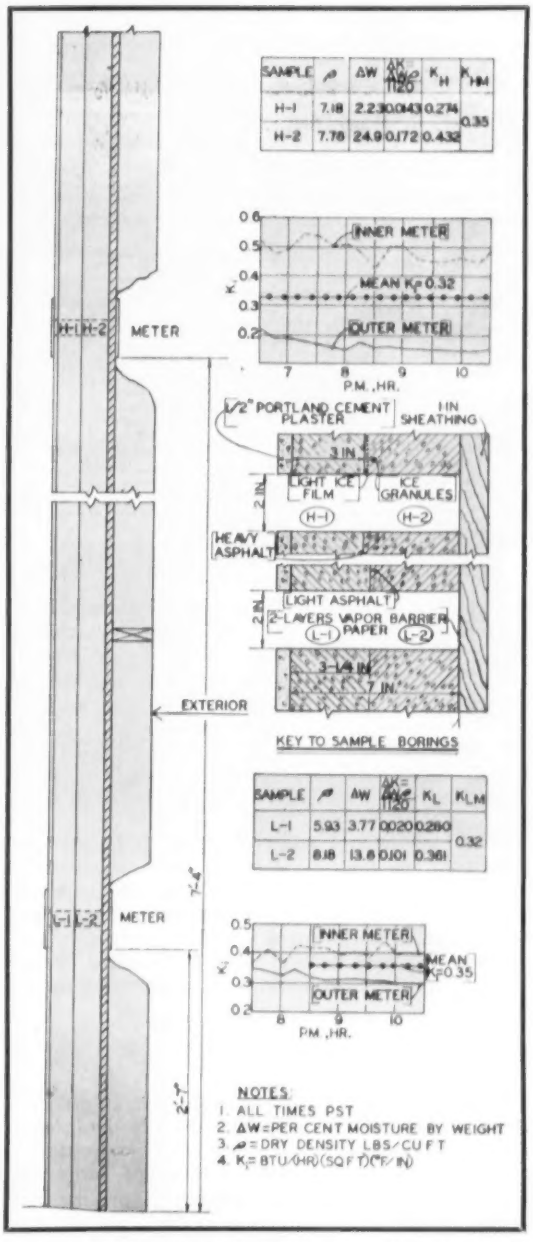
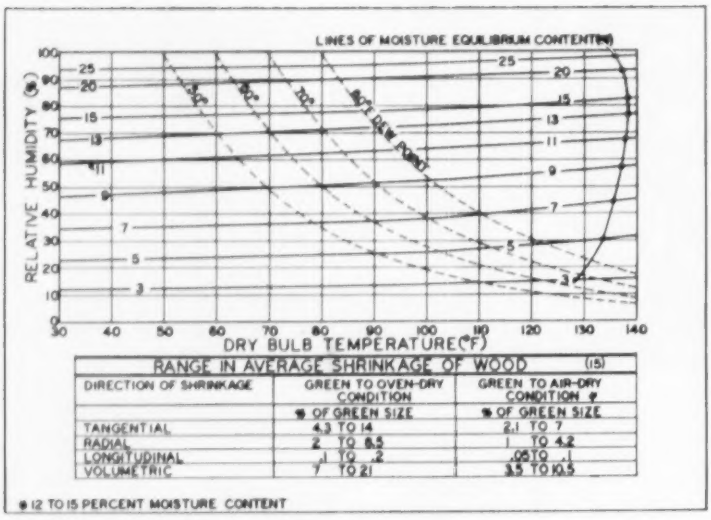


FIG. 7. HOW IN-PLACE TESTS were performed on wood framed corkboard (7-in. thick) structure. Meters were placed over cement plaster inner wall, and on wood sheathing of exterior surface.

Species	Specific Gravity	Moisture Content, Percent 0	10	20	30
Redwood	0.38	0.753	0.847	0.933	1.01
Douglas Fir	0.45	0.878	0.983	1.081	1.17

Fig. 8, indicates relationships between moisture content of wood and psychrometric conditions of air. The



RANGE IN AVERAGE SHRINKAGE OF WOOD (15)

DIRECTION OF SHRINKAGE	GREEN TO OVEN-DRY CONDITION % OF GREEN SIZE	GREEN TO AIR-DRY CONDITION * % OF GREEN SIZE
TANGENTIAL	4.3 TO 14	2.1 TO 7
RADIAL	2 TO 8.5	1 TO 4.2
LONGITUDINAL	.1 TO .2	.05 TO .1
VOLUMETRIC	7 TO 21	3.5 TO 10.5

* 12 TO 15 PERCENT MOISTURE CONTENT

FIG. 8. MOISTURE CONTENT OF WOOD is greatly influenced by both temperature and humidity. When green wood is used in insulated construction, shrinkage occurs (table, left) causing nails to loosen and open passages for vapor to penetrate the walls.

accompanying table shows that there is a great amount of shrinkage as the moisture content is reduced from green to air-dry or to oven-dry.

If a piece of unseasoned lumber were compression-nailed into a sealing mastic, loosening of the compression effect due to wood shrinkage would open nailings to vapor passage, thus neutralizing, to a great degree, value of the barrier. Even a change of 10% in moisture content may release tensile nailings to a dangerous degree.

Wood used in insulated construction must therefore be specified and installed at proper moisture content, since the inevitable workings of nature will result in deterioration of fastenings, connections, sealings, etc. In changing from green to air-dry condition, withdrawal resistance of nails in wood is decreased about 75%, and resistance to lateral loads is decreased about 25%.

Species and Decay Resistance

Within the vapor barrier construction, wood tends to dry out due to conditioning action of air in the insulation space. If moisture content is kept continuously below the fiber saturation point of the wood, action of the house fungus, *Merulius lachrymans*, will be restrained. However, if it is allowed to reach fiber saturation, the triggering action of the *Merulius lachrymans* phenomenon may occur if spores are present. This fungus may lie dormant for several years in the seasoned board, and all that is required to revive its activity is an increase in the humidity of its habitat.

In general, redwood and cypress are ideal for insulated cavity construction within the vapor barrier. Douglas fir, although not as durable as redwood or cypress, is of an excellent intermediate durability, and may be used in all steady service construction free of intermediate vapor dams.

Where any doubt exists concerning the service conditions, a properly treated wood should be used. As wood may take on moisture during treatment, and this may not be fully removed at time of installation, shrinkage may occur with resultant loosening of fastenings, vapor barrier penetrations, etc. It is not advisable to use salt-treated lumber in contact with aluminum sheets, even though satisfactory exceptions have been found and reported.[8] Wood should be of a good Dimension Grade. Sap wood should be avoided. The great durability of redwood is only experienced with the heart lumber, free of sap wood.

Fiber and Reflective Materials

Redwood Bark Fiber. A number of tests have been conducted with insulated construction utilizing redwood bark fiber.[8,10] This material is processed from the bark of the redwood tree of commerce, *Sequoia sempervirens* Endlicher. Its chemical composition comprises approximately 10% lignin, 60% carbohydrate material and 30% phenolic (Palconic) acid.[10] Principal factor responsible for its inherent resistance to burning is the Palconic acid. Moisture equilibrium contents of redwood bark fiber run close to that of wood (see Fig. 8).

Reflective Insulation. When air spaces are lined with highly reflective (low emissivity) surfaces, a very efficient insulation results.[8] One of the most important reflective materials is aluminum built into a series of spaces separated by wood strips. Spacing between vertical sheets is generally ¾ in., while that between horizontal sheets is usually 1⅜ in.

In order that this type of insulation may be successful, construction and materials must be right. Vapor barrier sheets must be thoroughly and effectively sealed with a proper tape. Reflective sheets must be installed with care to prevent improper variations in spacing. Joints on the refrigerated side should be closed to prevent condensation of high pressure water vapor on the insulation side of the finish sheet.

Where blower coils are used, ceiling lining sheet is generally considerably colder than balance of lining due to chilled air from evaporators first striking this surface. Vapor from product or from door openings may bypass coils and travel into first insulating space if this precaution is not observed. Incidentally, wherever liners are built in a similar position with other insulations, this same sealing should be effected, requiring, of course, an excellent vapor barrier.

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MR. ALEX PANCRAZI (left), Pisa Univ. (Italy) graduate, Chief Chemist, Eastern Wine Corp., Bronx, N.Y. (Right), Michael De Piano, N.Y. representative, Cooper Alloy Corp.

PANCRAZI OF CHATEAU MARTIN (Eastern Wine Corp.) tells why he specifies "*Cooper Alloy Only*" on stainless steel valves and fittings

Q. Mr. Pancrazi, why have you changed to stainless steel valves and fittings at Chateau Martin?

A. To assure product purity. Other metals can cause minute contamination reducing clarity and brightness; stainless steel does not.

Q. What valve model do you find most suitable?

A. After extensive testing, we picked a renewable-disc inside-screw globe valve—Cooper Alloy only.

Q. Why "Cooper Alloy only"?

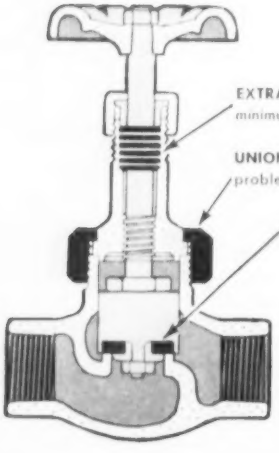
A. Because of three features I find combined nowhere else: renewable retained disc; union-bonnet construction; and extra-deep square-compression stuffing box.

Q. Why is each of these features important?

A. Soft disc gives better seal; retention in metal jacket prolongs its life. When disc replacement is needed, union-type bonnet eliminates difficulties normally found in screwed-in bonnets, removes another threaded joint from product contact. Extra-deep stuffing box with unique square compression reduces maintenance, gives tighter seal at stem.

Q. Don't any competitive valves possess these features?

A. Not one has them all. That's why, to maintain our product contamination-free and to reduce maintenance costs, we insist on "Cooper Alloy only."


EXTRA-DEEP STUFFING BOX holds minimum 6 turns Blue African asbestos
UNION BONNET JOINT eliminates problems found in screwed-in bonnets
RETAINED RENEWABLE DISC for tight seal and long life
COOPER ALLOY Figure 15RD Globe Valve, inside screw rising stem, 200-lb. service, screwed ends, renewable retained disc of composition you specify.

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THIRTY-FIVE YEARS OF STAINLESS STEEL PIONEERING

Fig. 9 shows effect of variation in emissivity in reflective insulation. For example, in a standard industrial construction, the emissivity of the facing sheets is set at a maximum of 0.05. This condition is recognized as unity for comparison of relative conductance. If the emissivity is increased to 25%, conductance will be increased by 33%.

This curve includes effect of total composite construction with wood furring strips. It is, therefore, imperative that clean aluminum produced from clean rolls be used. Otherwise, number of spaces must be increased.

Effective conductance of a space increases with temperature differential and with space or cavity clearance. Therefore, it is important that construction preclude convection currents from outer to inner spaces. This will be most important where there are high temperature differentials across a given wall.

Floor and Ground Conditions

When a refrigerated space is set directly on the ground, another enemy is encountered. The ground offers an insulating effect between the refrigerated space and the deep heat source of the earth which may be estimated at the temperature of local well water. In many coolers operating at temperatures above freezing, no floor insulation is used. In buildings of limited area, principal heat leak may develop through the perimeter of the floor area. This loss may exceed, by many times, the losses from deep ground sources.

When temperature of refrigerated space is below freezing, heat flow from the deep ground source is not sufficient to prevent cooling and freezing of the ground. In a room operating at 0F., temperature under an uninsulated slab will probably approximate + 3 or + 4F. Even if the floor is insulated, the near ground gradually chills to temperatures in the freezing zone.

Because of the cold floor surfaces, moisture in the ground tends to migrate upward to the cold "sink." In other words, ground moisture tries to reach the cooling coils.

The freezing point within narrow pores is below 32F., and within a wider pore, it is lower in the neighborhood of the particle than it is in the middle of the pore. Consequently, the freezing point is variable throughout the earth mass. Large soil particles tend to prevent ice segregation, and test mixtures of Ottawa sand did not show segregated ice upon freezing when the mixtures contained less than 30% of clay. However, heaves in coarse sands have been reported, thus suggesting that ice layers may form in all soils.

Sources of Water

Moisture for heave formation may reach the upper freezing layer under the following conditions:

1. A near-by source of supply from which the water may be pulled, as in the case of a shallow water table.
2. Soil should contain a certain percentage of fine particles.
3. Path between water table and freezing upper layer should possess good permeability and should be unobstructed.

Because silts are more permeable than clays, indications are that they are more dangerous in developing frost heaves.

Preventing formation of ice lenses seems to be the key to the situation, but many vague factors are involved and extended techniques of ground and soil structure are most important. The huge Alford Refrigerated Warehouses plant in Dallas, Texas, with two parallel buildings each 250 ft. wide and 1700 ft. long is built on a compacted dock-height fill. About 9,000,000 of the 15,000,000 cu. ft. space are under refrigeration without floor insulation, the slabs having been paved onto the fill in a unique manner employing airport construction techniques.[11, 12] There are no frost heaves in the floors or structure which are under continuous freezer operation without intermittent relief of any type.

In Dec. 1951, a test boring was made to 12 ft. of depth. Although the ground was frozen, there were no ice lenses apparent. Temperature at surface of slab was — 2F., while there was a fairly linear temperature rise to +20F. at the depth of 12 ft. Moisture content was 9% at 12 ft. depth, 14% at 1 ft., and 13% immediately beneath the slab. Moisture distribution pattern was very similar to that found in hydroscopic insulting materials.

Uninsulated Floors

Floors at Alford Warehouses are in sound and satisfactory conditions because permanent water table is very low, soil is right, and placing of fill and its compaction were proper for the condition to be encountered.

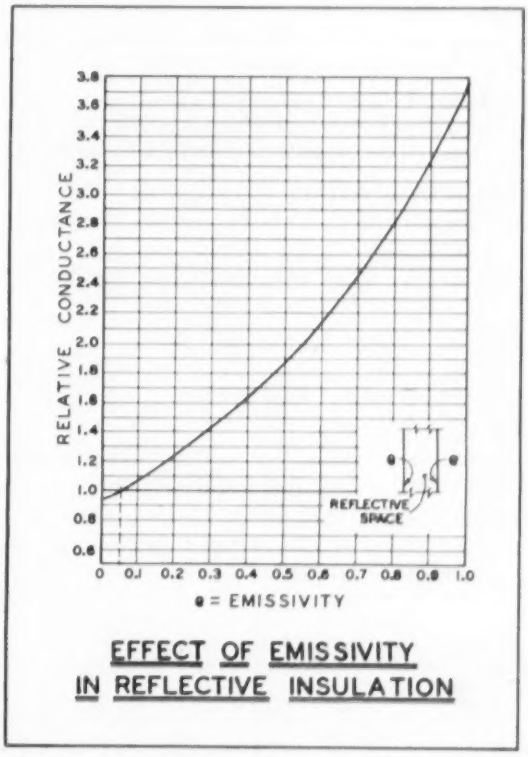

FIG. 9. **EFFICIENCY** of reflective insulation depends on the emissivity of the metal sheets employed.

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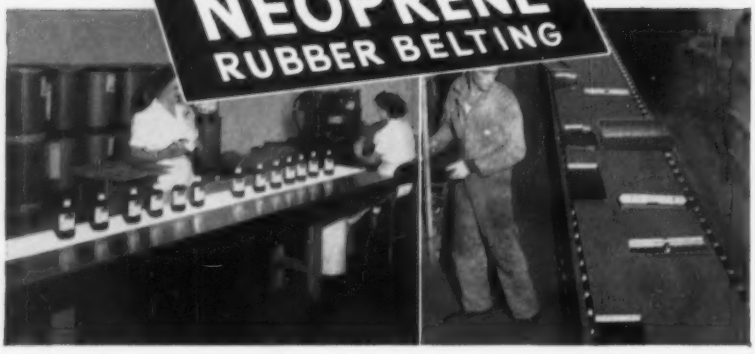
DUST OR DIRT

GLOBE NEOPRENE RUBBER BELTING



• Improved "thin-ply" belting with square edge, minimum stretch, positive traction, smooth surface and excellent flexibility, is taking the lead for conveying and power transmission. This belting is engineered by Globe for specific needs. Ideal for heavy industry or assembly plants, Globe's Black Neoprene Rubber Belt resists abrasion, oil, greases, acids or spillage that affect ordinary rubber belts. For the food handling industry, Globe's White Neoprene Rubber Belt and Hycar Rubber Belting resists organic and inorganic chemicals that have a marked effect upon natural rubber belts. For the textile, tobacco or other similar industries, Globe's Brown Neoprene Rubber Friction Surface Belt is valuable for many transmission operations. This belt is equally valuable for normal conveying operations where rubber covers are not required.

BLACK OR WHITE CONVEYOR BELTING —
for oily conditions or where combined heat and oil are encountered. High abrasion resistant 3/64" top cover, friction bottom.

WHITE OR BROWN BELTING —
friction surface top and bottom for transmission and conveying purposes.

WHITE OR BROWN RUFF TOP CONVEYOR BELTING —
for incline and decline conveyors.

WHITE HYCAR RUBBER BELTING —
for severe grease conditions, quick freeze temperatures, and above average heat conditions.

CLEATED BELTING —
with rectangular, crescent or U-shaped neoprene cleats vulcanized securely into the belt for conveying on severe inclines.

CUSTOM MADE BELTING —
cut to your exact width and length. All belting can be made endless at our plant or on the job by vulcanizing or cementing and air drying at room temperature.

WRITE FOR
"GLOBE NEOPRENE RUBBER BELTING CATALOG"

GLOBE

GLOBE WOVEN BELTING CO., INC.
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KNOWN FOR QUALITY THE WORLD OVER

Many other plants are operating satisfactorily without insulation in the floors. However, the necessary factor of safety is provided in some cases by seasonal operation or by converting of freezers to coolers during a sufficient portion of the year. The matter does not lie within the protection of a science, but rather within the realm of a developing art which can well afford extensive experimentation on smaller components before the larger, high-investment structures are built.

The temperature beneath an insulated floor will move into the sub-freezing zone eventually. Therefore, some means of heating is desirable to keep the ground temperature in a safe range. This heating may be accomplished with warm air ducts, natural convection ducts, sub-floor tiles, oil or glycol heated piping. In small installations, the perimeter heat feed may be sufficient to preclude freezing.

Reinforced concrete is a very poor insulator, since a 30 in. thickness of this material has about the same value as 1 in. of a usually accepted insulation.

In a number of cases, heating piping has been laid in the sub-soil before pouring the concrete slab on uninsulated ground. This operation is generally called "insurance." However, if ice lenses start to form and "insurance" heat is applied, how great will be the refrigerating load through the non-insulating concrete?

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*References 1 through 9 appear in Part I, FE Feb., p. 122. —*End*

Viroqua Cooperative Creamery grows with Leffel boilers

October 29, 1929

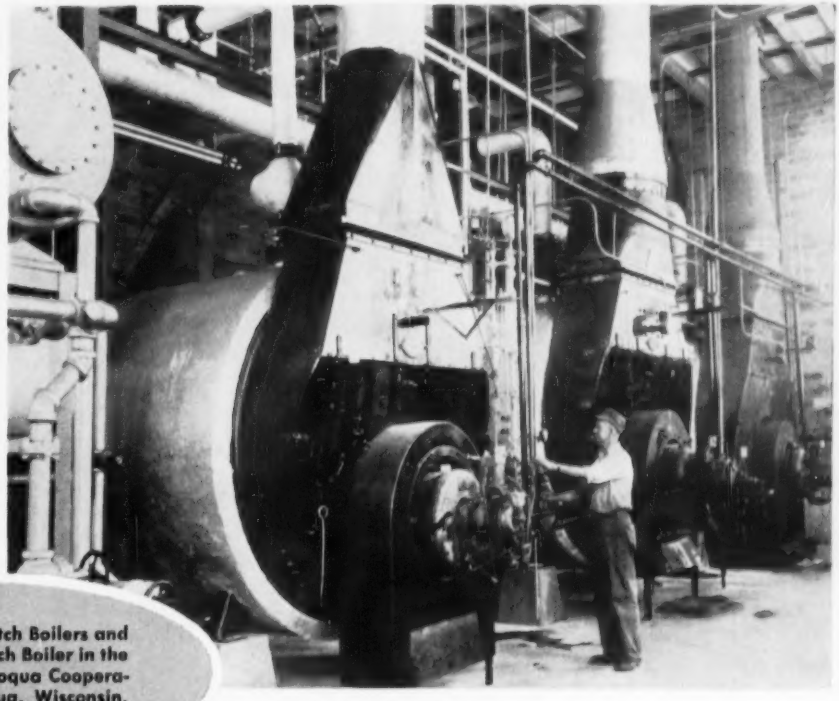
125 HP Leffel boiler shipped to Viroqua Cooperative Creamery, Viroqua, Wisconsin—their first Leffel boiler.

March 18, 1938

200 HP Leffel boiler shipped to Viroqua Cooperative Creamery, Viroqua, Wisconsin—their second Leffel boiler.

March 30, 1951

200 HP Leffel boiler shipped to Viroqua Cooperative Creamery, Viroqua, Wisconsin—their third Leffel boiler.



Two 200 HP Leffel Scotch Boilers and one 125 HP Leffel Scotch Boiler in the boiler room of the Viroqua Cooperative Creamery, Viroqua, Wisconsin.

Viroqua has progressed with Leffel through two plant expansions which have more than tripled their steam generating capacity because they've learned by experience that Leffel boilers are . . .

- absolutely reliable
- highly efficient
- economical to operate
- conservatively rated—with the ability to produce far above their rated capacity
- completely safe
- inexpensive to maintain
- of the strongest and best construction obtainable

Leffel has served the dairy industry for 95 years and understands its requirements well. Today's Leffel boilers reflect this know-how in their quality construction and fine workmanship. If you're boiler conscious right now, get all the facts before deciding on any one make of boiler. If you do, we're sure that Leffel will surpass your requirements for efficiency, dependability and economy. And you'll appreciate doing business with a company which believes follow-through on every transaction as important as the original purchase.

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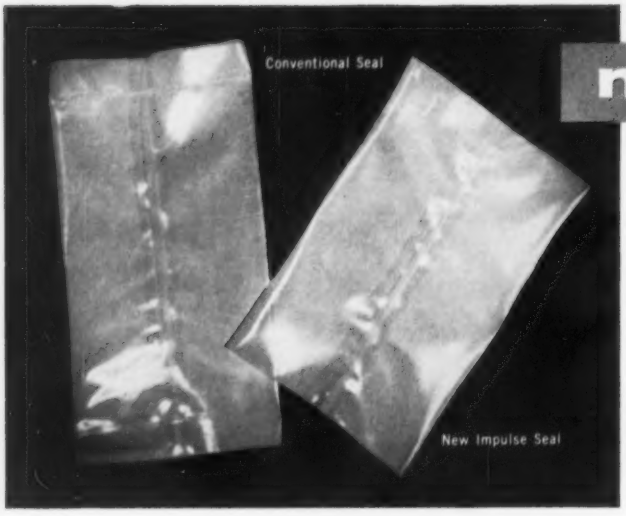

new

Polyethylene impulse seal with Stokeswrap eliminates film waste

Film savings made possible through a new electronically controlled impulse sealing method are graphically illustrated at left. This new impulse technique provides a strong, positive seal on such thermoplastic materials as polyethylene, pliofilm, vinyl, and other heat-sealing films.

See the Stokeswrap with impulse sealing and electric eye registration in operation at the Packaging Show in Booth 821.

new

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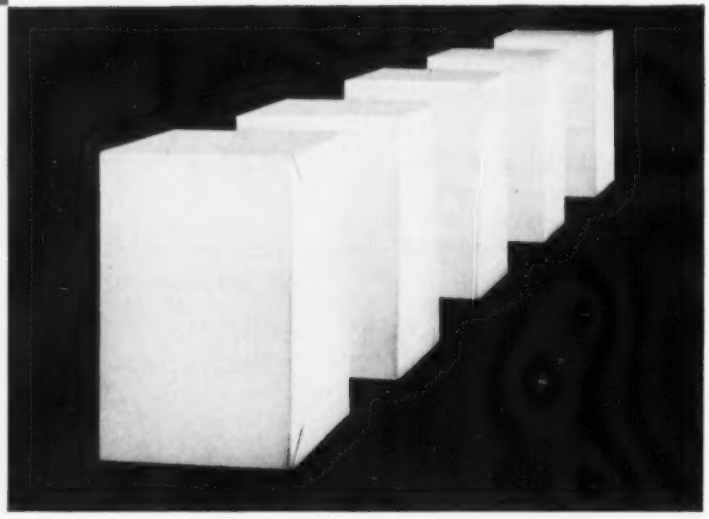
Free-flowing products can now be filled and sealed in cartons at the rate of 350 per minute. Using hot melt adhesive, cartons are sealed under pressure and refrigeration with reactivation of the adhesive assuring air-tight, sift-proof sealing. A unique vibratory feed is electronically controlled to assure accuracy of fill, automatically compensating for fluctuations in product density.

See this cost-cutting development in operation at Booth 821.



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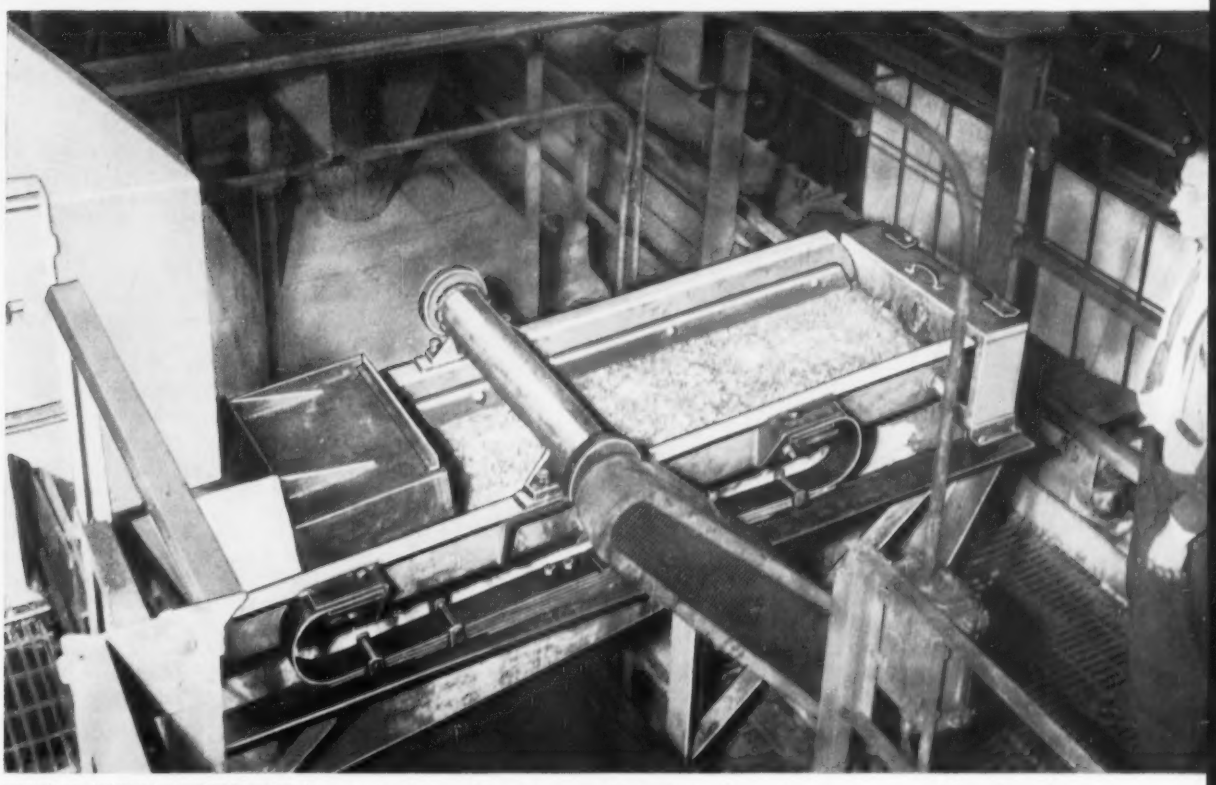
SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION



SEEN IS HIGHLY EFFICIENT foots removal (soya bean oil) at an Ohio plant. Compact screen is set on 3-deg. slope, handles about 7 gpm. of oil. Used is 80-mesh stainless cloth with 0.007-in. wire.

VIBRATING SCREENS:

They're now streamlined for new high performance

Used alone or in a processing line, these versatile units boost production, cut costs . . . Here are prime points on how they're built and how they work

A. G. BEDOY, Jr.
Link-Belt Co., Chicago

BECAUSE OF their high capacity, simplicity, and compactness, modern vibrating screens are finding ever-widening application in the sizing and separating of food materials.

A typical example is the refining of such vegetable oils as cottonseed, soya bean, peanut, and copra. We will detail specific installations. But first, how does a vibrating screen operate? And what are its mechanical features?

Basically, such a screen is a structure with means for producing rapid motion of one or more perforated or mesh surfaces. Since effectiveness depends upon the rapid motion, the unit is usually operated at 1,000-2,000 rpm., with strokes of $\frac{1}{32}$-$\frac{1}{4}$ in.

For highest efficiency, a screen must:

1. Convey material retained on its surface in such manner as to uncover the openings so that the undersize materials or liquids can be passed through.
2. Distribute the feed-flow to take full advantage of screening area. Motion of the deck should provide even distribution.
3. Agitate and stratify the bed to open it so that fine particles or liquids can work their way down through the larger-sized material and pass the openings.
4. Dislodge particles that stick or wedge in the open-

ing. Those with dimensions nearly the same as the opening will clog, hence motion of the screen must dislodge them.

5. Detain product before discharge. For efficient sizing or liquid separation, the undersize material should be retained as long as possible. It must be moved faster at the feed end, where volume is greatest, to obtain quick distribution and a shallow bed. At the discharge end, where volume is least, rate of travel should be slow to allow remaining fines or liquids to be removed.

Besides performing all of these functions, today's vibrating screen brings these benefits:

- **Low initial cost and power requirement.**
- **Minimum floor-loading rates.**
- **Easy maintenance, particularly with self-contained unit furnished with steel tank.**

Now for a look at construction details:

The screen has a shaft turning in a pair of bearings. Unbalanced weights either are machined into, or keyed to, the shaft. This assembly usually is powered by a V-belt drive. As weights rotate, the screen follows them through a path. When a vibrator is placed on top of the box, there is a slight rocking action resulting in elliptical motion, with the ellipse leaning toward the vibrator. This tends to move material away from the feed end and retard it at the discharge.

On most vibrating screens a cloth is pulled tightly across longitudinal steel members that are equipped with rubber caps. It may easily be changed by loosening tension bolts and sliding it out of either feed or discharge end.

The screen box is mounted on springs or rubber blocks, which prevent vibration of the supports.

It is important to specify a unit that incorporates the correct screen cloth. Capacities on liquid-type screens are based on percent of open area of the cloth. With this in mind, the cloth with the right combination of wire strength and open area should be chosen.

If waste solids handled are heavy and abrasive, wires of greater diameter should be used to assure longer life. However, when material is light and sticky, such as foots from vegetable oils, durability of screening surface may be the smallest consideration. In such a case, a light wire may be necessary to provide an increased percentage of open area and freer cloth conditions.

Cloth Weaves

Screen cloth is woven in a variety of materials—black steel, spring steel, all types of stainless steel, Monel, and brass. On liquid applications, a Type 304 stainless-steel wire usually is specified. However, where conditions require other types of metal, special wires can be supplied. Cloths of 60 to 120 mesh are commonly used on vegetable oils.

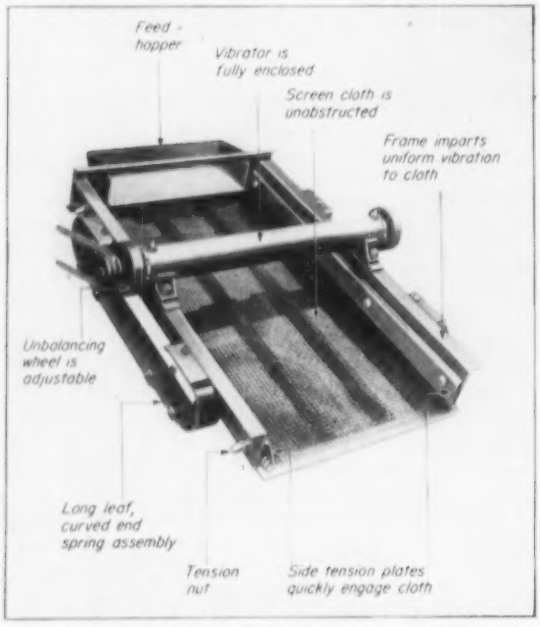
"Mesh" is a term that designates the cloth opening. When given as a numeral, it refers to the number of openings to the lineal inch. It is figured by starting from the center of one wire and counting the openings to a point 1 in. away. If the count does not work out to a full number, the fractional part should be specified.

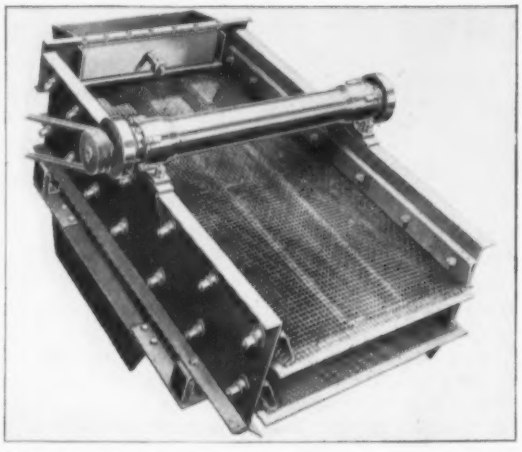
The actual opening between the wires is known as space. Thus, "¼-in. space, .135-in. wire" indicates wires that are ¼ in. apart and wire diameter of .135 in.

Most installations employ a double-crimp, square-weave cloth. It is so woven as to alternately arch the shoot (transverse wire) over the warp (longitudinal wire), and the warp wire over the shoot. Thus, each forms a support for the other, which keeps both wires tight and rigid to eliminate slipping or shifting.

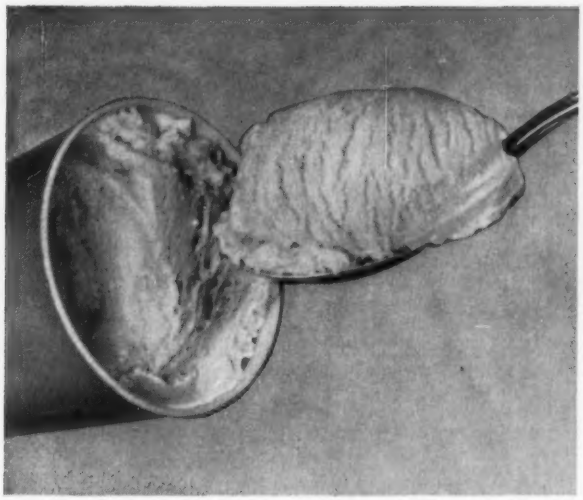
Several types of slotted cloths are available to permit greater open area and still give wire strength. One type has a slot approximately two times the width of the opening. The other has a slot six to eight times the width. This provides a greater increase in area, thereby upping capacity.

Long slotted cloth is used chiefly on very sticky and angular materials, and not in screening of vegetable oils,


Feed hopper
Vibrator is fully enclosed
Screen cloth is unobstructed
Frame imparts uniform vibration to cloth
Unbalancing wheel is adjustable
Long leaf, curved end spring assembly
Tension nut
Side tension plates quickly engage cloth



MODERN VIBRATING SCREENS have simplified design and low power requirement. Left: Features are spotlighted. For greater life, cloth is stretched across curved deck. Double-deck unit (right) offers multiple separation.



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Important factors in pie fillings are the natural sparkle, color and flavor of the fruit. Uniformly pure and clear, Rex or Globe® brand corn syrups retain these important characteristics, assure greater eye and taste appeal.

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Inside Story on POWELL STEEL VALVES

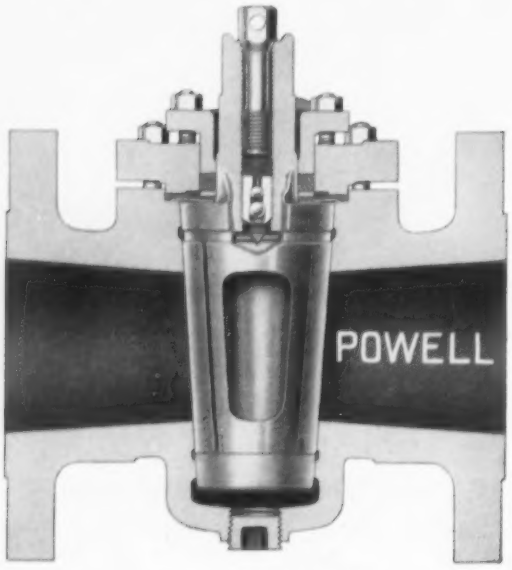

FIG. 3059--(Sectional)--A.S.A. 300-pound Steel Lubricated Plug Valve.

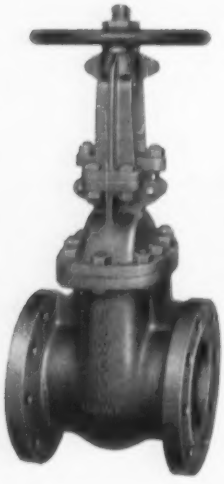

FIG. 2456 SS--OS&Y Gate Valve--1/16 Raised Face Separate Yoke Arms. Flanges are in accordance with ASA B16.5.

Steel Valves may appear similar on the outside. But their performance may be quite another story--for there can be a big difference in the metal, in design and in manufacture. And the inside story on Powell Steel Valves is that every valve has PERFORMANCE VERIFIED.

Only the finest materials are used in Powell Steel Valves. And painstaking quality control is rigidly enforced through each step of manufacture. For example, every machining operation is accurately gauged. All parts are thoroughly cleaned and degreased. As a final step in manufacture, EVERY POWELL STEEL VALVE IS GIVEN AN ACTUAL LINE TEST.

Because of Powell's painstaking quality control, plant shutdown through valve failure is practically unknown. Records from refineries, power and industrial plants the world over prove it.

Consult your Powell Valve distributor. If none is near you, we'll be pleased to tell you about our COMPLETE quality line which has PERFORMANCE VERIFIED.

Fig. 2433 SS--Stainless Steel Bolted Cap Swing Check Valve for 150 pounds W.P.

PERFORMANCE PV VERIFIED

The Wm. Powell Company, Cincinnati 22, Ohio . . . 111th YEAR

POWELL VALVES

BRONZE, IRON, STEEL AND CORROSION RESISTANT VALVES

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except where extreme conditions exist. Solids are held on two sides only and cannot become firmly wedged.

Length of the opening allows a slight spring action that aids wires in freeing themselves of any sticky or "on-size" particles and so eliminates binding.

Most vegetable-oil screening is done with some form of cloth mentioned above. There are occasions where perforated plate has been tried. In most cases, however, this is not satisfactory because of the smooth surface, which allows liquid to skim across the top, carrying off oil with the foots.

Several case histories with various oils and different mills will indicate the range of capacities obtained with vibrating screens.

Typical Applications

A cotton oil company in Texas crushes 140-160 tons of cotton seed per 24 hr. using hydraulic presses and expellers. Oil from the press is recirculated through the expeller for cooling, and production is about 4½ gpm. (based on 300 lb. per ton).

It is estimated that solids in the recirculating oil are about 1-2%, and that a screen with 100-mesh cloth removes about half of them. This operation produces a flaky-type solid, and no foam problem is encountered. The screen cuts refining losses to well below the 9% maximum required by the mill.

Screening of Babassu oil is another typical example. Here, oil is pumped directly from the expeller. The mill crushes nuts at about 2 tons per hr., yielding some 2,500 lb. of oil or 5¼ gpm. The screen has 100-mesh cloth, and laboratory tests show that it removes approximately 54% of the solids, reducing them from 5.4 to 2.5% by weight. This oil, too, has not been noted to foam in passing over the unit.

In another cottonseed operation, a mill crushes 110 tons of cotton seed per 24 hr. with eight hydraulic presses. Oil from presses flows directly to a surge tank below the first floor, from which it is pumped to the screen, then to storage. This installation is typical of oil mills in which only hydraulic presses are used.

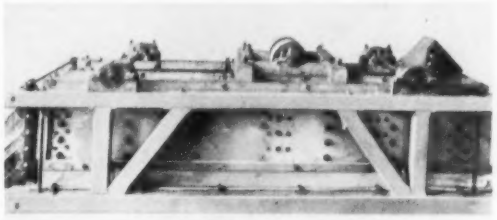
Temperature of the oil at the screen is about 125F. At the trough immediately in front of the press it is 135F. Screen handles about 3 gpm. Removal is about half the solids, and refining loss has been cut from 5.7 to 5.5%.

There is a slight foaming in this operation, but it is not objectionable.

There are many installations of vibrating screens handling soya bean oil. Here, more than 50% of the solids are removed. Foots discharged at the end of the screen contain about 35% oil.

Note that these data are for individual mills. The figures might vary slightly from plant to plant.

This article is based on the paper, "Vibrating Screens and Their Use on Vegetable Oils," which was presented at the Third Convention of the International Oil Mill Superintendents Assn. at Torreon, Mexico.—End



Pioneer 1919 unit. Since then— They've Come a Long Way

True, today's vibrating screens are a far cry from their ancestor (above).

Yet, the hows and whys of their gradual development bring the modern mechanical advances into sharp focus.

First models were open wooden boxes with screen cloth stretched across. They were supported on springs and rested against a ratchet placed rigidly on a shaft, which was fixed to a stationary base. The ratchet knocked up and down against the box to vibrate it.

An early improvement was to fit the vibrator to the box so that both oscillated together, but the unit was still basically designed for sizing of dry materials. Although frames were deep enough to accommodate one, two, or even three screening decks, there was only one screen box for all three conditions.

Awkwardness in use was but one disadvantage of these wooden units. Further, wood-working was expensive, parts were numerous, the screen was very heavy, and it required too much head room.

To make matters worse, vibrations often shook the frame loose, and getting proper tension on the screen was very difficult. Springs were on top of the frame, which added to general inaccessibility. And it was virtually impossible to use heavy cloth because space under the tension plates was cramped.

Strides in Design

All of this started manufacturers looking into steel screen boxes, which were a vast improvement over their wooden counterparts. In addition, steel boxes were made separate for one-, two-, and three-deck screens.

As experience was gained, it was found that stretching the screen across a curved or cambered deck gave greater cloth life. This also permitted placement of the cloth inside the box, instead of in a separate mounting frame that was then set into the box's frame.

Further developments included special vibrating screens for liquid applications. Earlier existing designs had to be modified for efficient handling of liquids.

And vibrators themselves had a similar period of improvement. Formerly this unit was mounted on top of the box and was lubricated by oil scoops, which tended to work loose.

Making each unit dust-tight was still another problem.

Moves to overcome the various difficulties led to a screen that was the forerunner of the present dual-bearing type. It differed mainly in vibrator design, having a ball-bearing unit rather than today's self-aligning roller bearings. The vibrator was grease-lubricated, as it is now. The efficient, present-day screen, is described in the accompanying article.—*AGB*

APR. 29: Plant Burned Down . . .

UP IN SMOKE goes million dollar plant just 3-months before start of new canning season.

. . . AUG. 8: Brand New One On-Stream

JUST 14 WEEKS LATER new 50%-larger facility begins canning the season's crop of Blue Lake beans.

Cannery Gone—*But New One's Up And Running in Mere 100 Days*

"Count 'em out!" was the blunt curbstone verdict when fire razed NPC's plant almost on the eve of the important green-bean season. . . . But that judgment was much too hasty. For company men, builders, and equipment makers proceeded to "teamwork" an entirely new $1½ million facility into operation in one-third the usual time

G. A. LOWEN and C. R. HAVIGHORST
Plant Manager, Northwest Packing Co., and Senior Associate Editor, "Food Engineering"

"FOUR MONTHS AGO to the day, our main plant burned to the ground. We were horrified. All our equipment and machinery—groomed over the winter for the new season—was a total loss!"

The speaker was President Max Lehmann of Northwest Packing Co., Portland, Ore. And the occasion was the ceremonial opening, last Aug. 29, of the company's brand new $1½ million cannery—actually put into operation on Aug. 8, only 100 days after flames had ruined the former structure.

Considering that such major projects of building and equipping commonly take at least 10 months, this was certainly a striking engineering achievement.

No prospects could have been more bleak than those faced by NPC on April 29, the day of the fire. "But almost before the smoke had cleared," continued Mr. Lehmann, "the decision was reached to build this new plant. For our prime product, Blue Lake beans, would be up ready in August.

Despite a rash of contradictory advice from those who pronounced the plan impossible, Lehmann and his staff were figuring with architects, contractors, engineers, and machinery and equipment suppliers before four days had passed.

There was a big boost, too, in the form of spirited cooperation on the part of company workers. Saving of vital company records by the plant personnel, only minutes ahead of the flames, stood as a key factor in getting the plant "back on the road."

Over First Hurdle

At the preliminary meeting, it was decided that the new bean line should have a rated hourly capacity of 10 tons—50% above volume of the destroyed plant, and with provisions for expansion. The process engineer (John Blakey, American Can Co.) immediately prepared a rough draft of it.

The architect meanwhile was in-

structed to collaborate with him and produce tentative plans for a new building to be constructed on the old site. And each agreed to the stipulation that the plant would be completed and on-stream in 100 days.

Overall responsibility, of course, rested with top management. However, detailed planning and overseeing was shifted to the plant manager's shoulders. He was soon to be on the firing line 17-18 hr. a day. His first assignment: Procurement of process equipment.

The green bean process is fairly well standardized. And, knowing the desired capacity, he directly began contacting machinery and equipment suppliers, giving them preliminary orders for the production equipment. This was done to ascertain if units could be delivered as specified. For if the makers couldn't comply, there was no reason to speed the rebuilding.

The process engineer and architect produced the first rough building design without difficulty. But, then everything ground to a halt when: (1) It was found that the old plant site would not accommodate the increased capacity and (2) the building contractor reported he couldn't meet the construction deadline if he had to demolish the burned building's concrete floors and remove their footings.

Without quick action, the project wouldn't even get off the ground.

Steps in Time Save Nine

However, advanced planning had led the company to get an option to buy half of a parcel of land adjoining its present property. The other half was owned by the Union Pacific Railroad Co. The whole parcel offered ample space for the proposed plant, and there were no obstructions to be removed.

Immediate contact was made with the railroad company—but the owner of the other half of the property couldn't be located. He'd disappeared into Mexico on a vacation.

Innovations in Slab Construction Gain Precious Time

INSTEAD OF WAITING for fill to settle and floor to be poured, eight concrete "pads" are prepared along outside of building foundation.

THEN tilt-up panels are poured on these pads like pancakes, one each day for 6 days. Roofs over pads protect slabs while curing.

TEN DAYS LATER, panels are set in place on foundations, and building takes form. Note that pits for gutters and equipment have been dug, but floor has not yet been poured.

Nevertheless, the company's lawyer gave assurance that the option was valid and that, even though not finally executed, building could begin and the actual purchase of the land handled later.

In this tense situation, the railroad company's deliberations seemed to take an inordinate time. But at last the deal was consumated.

Smooth Sailing Ahead?

In developing the rough plans, the process engineer had stipulated the space needed for the production lines, and for planned future expansion. Using these specifications, the architect had designed a sawtooth-roof building, as directed by company management.

But the building contractor had not been properly informed regarding these plans. He had assumed the new building was to be a "warehouse type," with flat, level floors and bowed roof. Apparently, he'd been unaware that cannery floors were designed with proper slopes for drainage, that gutters for waste water were needed, and that natural light from the sawtooth construction was of considerable importance.

When shown the drawings, he insisted that this type construction would require more time than his estimate—with a likelihood of delaying completion beyond 100 days.

When taken on a tour of other nearby modern canneries, however, he revised his time estimates, and agreed that he could meet the previously specified schedule.

Meantime (May 17), grading and pit excavating was under way, and footings were being poured. Here, the architect had provided the contractor with plans based on a detailed sketch designed by the process engineer.

Problems of Integration

"During construction, the program was so accelerated that we never had blueprints of the entire project. It was a continual race to keep the draftsmen and planners one short step ahead of the bulldozers, carpenters, construction crews, and other crafts," Lehmann said. But his words reflected the real momentum now gained.

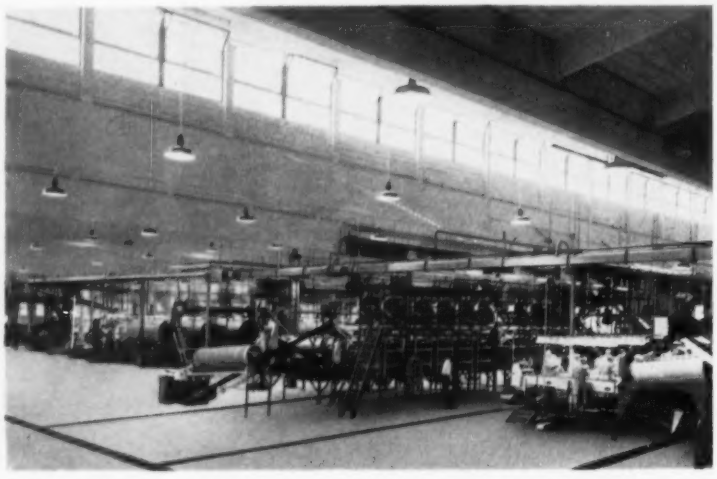
Of course, the process engineer had now discarded his first plan on the old site.

The second plan determined the building area necessary for ideal installation of a 10 ton/hr. initial operation. It was in sufficient detail so that the architect could develop his plans from it, also so the plant manager could use it in placing orders for equipment.

A third plan was drawn while negotiations were still in progress for the new property. It plotted the area available for the green bean and fruit and berry operations, Tote Bin storage, future warehouse space, employee parking, boiler room location, and can runs from rail cars to process. It also allowed space for at least one 65-ft. bay for future plant expansion.

Simultaneously with ground-breaking, the process engineer and architect began drafting a progressive set of plans for the building contractor.

EIGHT CRAFTS work harmoniously—construction, carpentry, and painting proceeding while machinery and equipment are installed.



NEW LINES getting their shake-down run on Aug. 8. With routine smooth, following day saw operations proceeding on two-shift basis. Note how equipment is installed for efficient, straight-line operation.

These drawings were followed by a series of working plans detailing the following:

1. Location of pits to accommodate equipment and gutters, also angle of floor slopes to gutters.
2. Location of continuous-cooker footings.
3. Specifications for building contractor.
4. Equipment and machine placement.
5. Wiring circuits for electrical engineers.
6. Steam and fresh water systems for supply to process for the mechanical contractor.
7. The empty- and full-can handling system.
8. Cat-walk and conveyor details

This man defies gravity

(He maintains propylene glycol specifications through quality control)

At every stage of processing propylene glycol, U.S.P., a sample is drawn. Is ash content low enough? Does distillation fall within range requirements?

What about sulfate turbidity?—Our chemist checks.

Diluting 5cc. of propylene glycol with 15cc. of distilled water, he adds 5 drops of hydrochloric acid and 5 drops of barium chloride. The complete clarity that results tells him, "OK". So must other tests.

If specific gravity, for example, proved too high or too low, corrective measures would be taken immediately to change it. And we do mean *change it*. For the specifications of Dow propylene glycol meet or exceed those set by the U.S.P.

Quality control is one more area where you'll find Dow increasing the value of your chemical dollar. You'll find extra efforts and services, planning and modernized techniques helping you to shape the future, today. THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. GD 809G.

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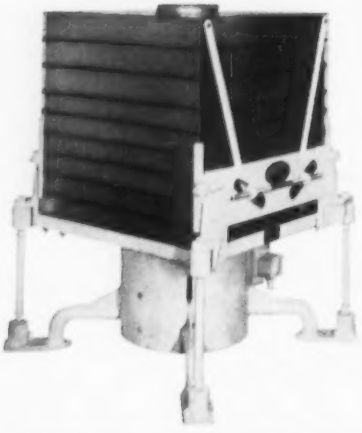
The famous line of RICHMOND equipment — now manufactured by Sprout-Waldron — offers you more than ever before.

In addition to new, improved features and the most advanced designs, you get expert engineering guidance on installation . . . plus finest workmanship and service . . . plus 100% reliability. These extra BIG PLUS values are yours at no additional cost with RICHMOND-SPROUT-WALDRON equipment. Write for complete details.



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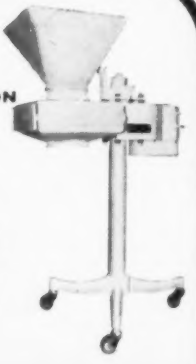

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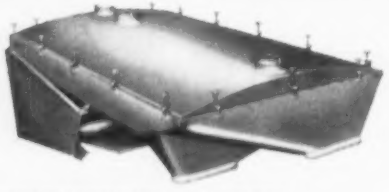

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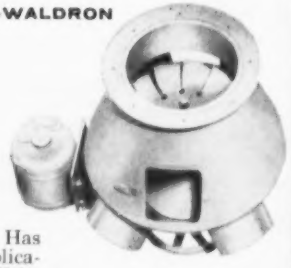
STREAM SPLITTER



Splits one stream into two to eight equal divisions. Handles all types of free-flowing materials. Requires little space. Easy to install. Has many money-saving applications. Get full details. Write for Bulletin 137!

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for the prefabricating contractors.

Now timing approached the split-second point. To keep on schedule became a matter of logistics. Building materials had to arrive exactly as scheduled. With plenty of construction labor at hand, the building contractor had two full crews at work from 5 a.m. to 9 p.m. daily. The architect had the process engineer's final plans at hand. His drawings were made progressively, and only by keeping continually at it could he stay one step ahead of the contractor.

An innovation employed to speed construction was use of eight 2-in.-thick concrete "pads" upon which the tilt-up walls were poured. Usually, these walls are poured on the floor slab of the building. However, this slab couldn't be poured until the area fill was firmly settled. Then it would require 1-week curing —a period that the contractor could ill afford to lose at this stage, since still to be figured were 2-weeks' of curing for wall panels of conventional mix concrete.

By pouring one panel daily on each of the 8-pads, the required 48 wall panels were finished and stacked like hotcakes—all in a period of 6 days. A rich mix (6½ sacks cement per yd. of concrete) and an additive (Plastiment) were used to hasten curing and provide added strength to the panels. In exactly ten days, the panels were ready to be hoisted into place on the building foundation.

Assembling the Building

By careful planning, pits had been excavated, and the fill and foundation were in by the time the wall panels cured. Some panels weighed as much as 32 tons. There was only one crane in the area that would handle such a load. Otherwise, the contractor would have used two to speed up the installation.

Immediately after the panels were in place, the glue-laminated beams, prefabricated monitors, and purlins of the sawtooth roof were fixed in place. Then the concrete floor slab was poured.

Because of the steel situation at that time, delivery of steel beams would have required 6 months. So that was out. However, laminated beams, which provide a long span with minimum depth (compared to sawed timbers) were considered just as satisfactory and were then available.

Construction was now moving at a rate with which Portland building inspectors could not keep pace. But delays could not be tolerated if schedules were to be met. So with Portland's approval the builder employed the Northwest Testing Laboratory as accredited inspectors.

Three lighter cranes were used to set the laminated beams, monitors, and purlins of the sawtoothed modular type roof, and the roof-decking.

To expedite the relatively slow framing work required in building the monitors (vertical window-frame section of sawtooth roof), they were fabricated on the ground instead of in place.

On July 9, just 72 days following the fire, the building was "assembled." Remaining at work were roofers, sheet metal workers, painters, and a reduced carpenter crew. Outside, the final grading was going on.

Neck-and-Neck Race

Paced by the surprisingly fast progress of the builder, the plant manager had swung into step with his equipment-machinery procurement and had set firm dates of delivery.

From the process engineer's drawing, the numbers and kinds of machines had been determined. But there was no safe storage space available in which to stockpile this equipment. Closely timed arrival of pieces as needed had to be achieved for orderly, efficient installation. So each supplier was requested to confirm, by letter, the scheduled delivery of equipment at exact times. Here, again, was a problem in logistics, because a considerable number of shipments were due from Eastern manufacturers.

To facilitate identification and expedite delivery and installation, each piece of equipment, machine, or other component was given an "item number." Thereafter it was generally referred to by this number instead of by a description of the piece.

Equipment that was to be fabricated locally (metal framework, sheet metal parts, catwalks, conveyors) was tagged with similar item numbers. Separate drawing were prepared for these units. As a precaution, some were pre-assembled at the fabricator's shop, test-run, then torn-down and delivered, ready for re-assembly and installation.

Manufacturers of power and power-transmission equipment were called in for conferences to assist in determining types of motors and hp., and kinds of bearings and pulleys to use with the locally fabricated machines.

Out of these meetings came design of the modular type conveyors. They are equipped with identical head and tail sections, and belting, motors, sprockets, bearings, and chain-drives are all standardized. This results in a number of efficiencies, especially that of ease of repair, and savings in replacement stocks.

Not All Sweetness and Light

On July 9, there were seven crafts at work in the plant (crews comprising 10 painters, 20 pipefitters, 45 electricians, 65 millwrights, 20 iron workers, and a miscellaneous number of sheet metal workers and riggers). The place was like a hive of busy bees—and sometimes just about as complacent.

The pressure for more and more speed was on. There was no time to prepare elaborate written work schedules for the crafts. Instead, instructions were given verbally.

This posed the pressing problem of coordinating work between the crafts—so one would not get underfoot of the other. Approach to the human relations involved was direct—and proved successful.

Regular semi-weekly "gripe meetings," actually dealing in group dynamics rather than individual matters were called. Attending were foremen and superintendents of the various crafts and contracting outfits. Thus, all complaints and problems were aired and, by group discussion, they were pinpointed and then compromised. With but few exceptions, this method resulted in relative harmony among the workers.

Said Lehmann: "This job could not have been done had we not had the goodwill and all-out cooperation from suppliers, machine manufacturers, contractors, service industries, insurance people, bankers, and a host of other friends who pulled together to help us handle it."

Some of the final equipment to arrive at the plant came by air freight. For certain manufacturers had been disappointed in shipment of parts from their suppliers, and so air freight was the only way to meet the delivery dates.

Had these units been shipped by rail, there would have been at least a one-week delay in completion of the lines

(For listing of equipment suppliers and men responsible for this major feat, turn to p. 149.) —*End*

It's **EASY TO SEE** *why Paramount picks PYREX® pipe*

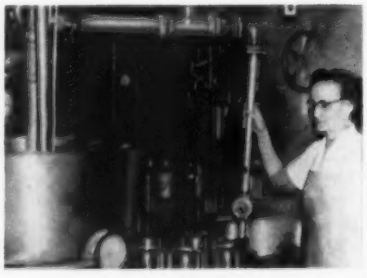
The evidence is right in front of your eyes when you walk into the home of Paramount Foods in Louisville.

The gleaming PYREX pipes are everywhere. You can see the vinegar flowing through them, clearly, for there is no sign of clouding corrosion.

Yet . . . these PYREX pipelines were installed twelve years ago. Other types of pipe, installed at the same time as a test, long ago succumbed to the corrosive action of the 120-grain vinegar the pipes must carry (normal household vinegar is 40-grain).

Mr. Lewis Hirsch, President of Hirsch Bros. & Co., likes PYREX pipe because it is "less trouble." You can see that it is clean. You can see what is going through it. It won't corrode. It doesn't contaminate the product it carries. It doesn't grow invisibly weaker from acid eat-through. It's easy to install. The plant maintenance man can install it easily with ordinary tools.

For complete information on how PYREX pipe can be used in your plant to help you handle your product better and more economically, write, wire, or phone our Plant Equipment Sales Department.



Corning manufactures a complete line of PYREX brand glass fittings to meet your pipeline needs. Bulletin EA-3, "PYREX brand 'Double-Tough' Glass Pipe and Fittings" describes them. We'll be glad to send you a copy.

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Ultrasonics Hits Packaging Line

Latest plant use of this high-frequency technique is deaerating necks of beer bottles. And there's a sizeable list, of potential applications waiting to come "out of the lab"

BOOSTING QUALITY: This ultrasonic unit effectively deaerates the bottles before they reach the capper. Agitator (arrow) contacts each container to transmit high-frequency vibrations that cause foaming. Engineer is seen checking output of generator.

A. S. DAVIS

Project Engineer, Mack Electronics Div., Inc., Plainfield, N. J.

ULTRASONIC ENERGY is making good on more of its promises to the food processor. It has long indicated its ability to do many things better: Separating, extracting, emulsifying, and cleaning.

Now it is turning a trick in a special phase of commercial separation—removing air from bottles of beer and ale on the packaging line.

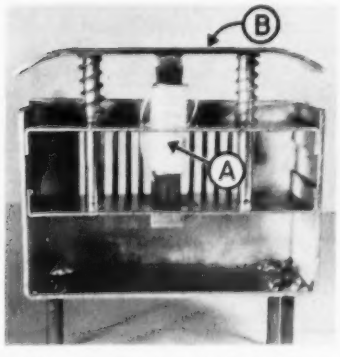
The new brewery application of ultrasonics (at P. Ballantine & Sons, Newark, N. J.) stems from the need for a better method of removing air from the neck of a filled bottle, since residual oxygen tends to deteriorate beer quality. Although an acceptable level is considered to be 1 cc. of air per 5 oz. of product, this ratio can be remarkably reduced with use of the ultrasonic technique.

This process is entirely physical, having no effect on flavor or appearance of the beer. Rather, it is used only to protect these quality factors.

On the packaging line, air is removed by causing the beer to foam. Formerly this was done by one of two methods—jetting or knocking.

In jetting, either pressurized CO_2 or beer itself is squirted into filled containers, the resulting agitation producing the foam. But this technique usually is limited to canned beer, since necks of bottles are too narrow for effective application.

Knocking consists of striking a bottle with a pair of steel rods, just before the filler tube is removed. On high-speed machines, bottles must be struck with considerable force so that sufficient foaming occurs before they are capped. Moreover, the striking cannot be carried out earlier in the filling process because the bottles are then under pressure. Such premature agitation would boost internal gas pressure



THE AGITATING is done by this unit. Receiving electrical energy from remote generator, transducer (A) converts it to mechanical energy that vibrates spring-mounted shoe (B).

Past and Future of Ultrasonics

Extracting flavor from hops, refining chocolate, and measuring fluid flow have been three earlier commercial uses of ultrasonics*.

More recent industrial applications include recording and controlling viscosity, de-scaling meat hooks, cleaning filling machines, and removing foreign matter from egg shells**.

10 New Possibilities Ranged

Furthermore, researchers are now at work gaging the possibilities of—

Emulsifying mayonnaise and other salad dressings. (However, attempts to incorporate tomato pulp into French dressing have been unsuccessful, since the pulp absorbed too much energy for satisfactory mix.)

Homogenizing peanut butter and baby foods. (Past applications to milk were successful, but too costly).

Extracting vanilla and coffee beans. (Cold processes promise higher yield, better quality.)

Ageing cheese and wine. (Accelerated rate can cut storage charges.)

Separating starch from slurries, clarifying fruit and vegetable juices, collecting solids from gases, and removing meat from bones.

Degassing milk, soups, and juices. (Toward improved flavor and stability.)

Altering jelling properties of gelatin and pectins by depolymerizing. (Greater product versatility foreseen.)

Crystallizing sugar. (For increased process control.)

Catalyzing fermentations. (To speed rate.)

Cold-sterilizing heat-sensitive materials.

* These three applications were covered, respectively, in FE Feb. '53, p. 48 and Nov. '55, p. 174; FE May '55, p. 82; and FE Dec. '55, p. 135.

** Equipment for the first two applications named here is made by Bendix Aviation Corp., Davenport, Iowa; for the third, Branson Ultrasonic Corp., Stamford, Conn.; and for the last, Murdock Laboratories, Port Washington, N. Y.

NEW!

MODEL HL15-10

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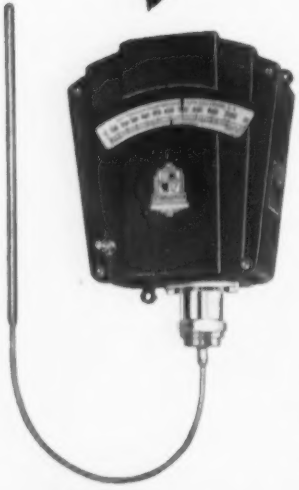

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- Ideal for positive high temperature limit control in processing of high-cost materials . . . protects against loss or damage to equipment or materials.
- Cuts off heat supply if pre-set temperature is exceeded.
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which, in turn, prevents complete filling of the bottle.

To make matters worse, knocking a bottle just once (on a high-speed filler) does not always remove sufficient air. Thus, fillers must sometimes be modified to accommodate additional knockers and extended conveyor runs.

But the brewer's main problem is breakage resulting from these blows. This can be troublesome as well as costly. Aside from loss of bottle and product, there is the hazard to personnel. And generally, production must be halted to clear away broken glass, which otherwise might cause further breakage and damage to the filler.

However, the new ultrasonic device (Mack Electronics Div., Inc., Plainfield, N. J.) overcomes these difficulties by:

1. Providing highly efficient agitation that produces numerous small bubbles for effective foaming and air removal.

2. Virtually eliminates the bottle breakage in the filling stage.

In addition, this equipment is specially designed to withstand the daily "hosing down" in a brewery.

Unit and Its Operation

The equipment (see photos) consists of a 250w. generator and a magnetostriction transducer connected by a supply cable. A spring-mounted shoe on end of transducer accommodates bottles on the filling line.

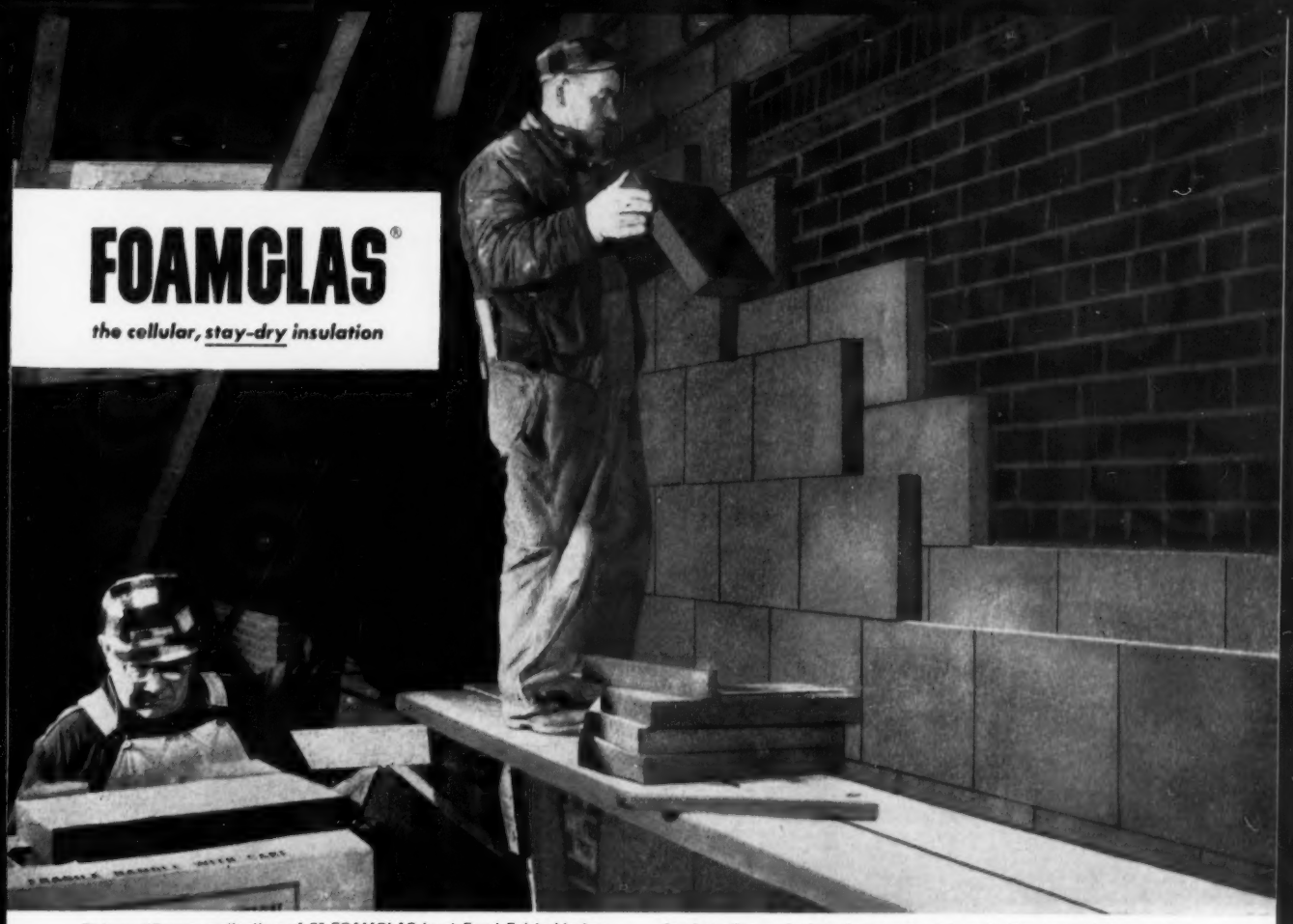
The generator is basically a tunable 22-kc. oscillator and power amplifier. And the transducer is used to convert electrical energy to mechanical energy (vibration) at the shoe. A control unit is also available for remote operation.

Briefly, here is the principle of ultrasonic agitation: High-frequency sound waves emitted by the transducer are converted to small-amplitude vibrations (at very high accelerations) in the liquid. High internal pressure causes millions of tiny vapor bubbles to form and collapse many thousand times per second. And this effect (cavitation) produces the highly efficient agitation.

For plant operation, the transducer-shoe assembly is so located on the filling line that agitated bottles have maximum travel time before they are capped. The shoe, mounted horizontally, briefly contacts each passing bottle just before filler tube is removed. Agitation of the beer is instantaneous, and foaming is complete before capping. —*End*

FOAMGLAS®

the cellular, stay-dry insulation



This multilayer application of 2" FOAMGLAS is at Food Fair's Linden, N. J., abattoir. In this and similar installations throughout their chain, Food Fair relies on moisture-proof FOAMGLAS to help protect food quality . . . by insuring constant, long-lasting insulating value for efficient refrigeration at low cost. Insulation Contractor: Waverly Builders, Inc., Hillside, New Jersey.

In stores and warehouses throughout their growing chain . . .

Food Fair depends on moisture-proof FOAMGLAS to keep insulating value up—refrigerating costs down

In ten short years, Food Fair Stores, Inc., Philadelphia, has grown from 89 stores and sales of $101 million to 237 stores and annual sales of nearly $475 million. Constant, careful attention to food quality has played a big role in that phenomenal growth. And Food Fair's use of *moisture-proof* FOAMGLAS for dependable insulation in refrigerated areas in their stores and warehouses reflects that attention to quality.

Food Fair has found that FOAMGLAS stands for constant insulating efficiency without the costly headache of insulation replacement. Its sealed cellular structure and all-glass composition make it an effective vapor barrier—sealing out the moisture that destroys efficiency of ordinary insulations. And the unique combination of FOAMGLAS strength and rigidity makes it an ideal structural material in many applications . . . even under floors where it can easily withstand loads of over seven tons per square foot.

In various applications throughout their chain, FOAMGLAS insulation for roofs, ceilings, corewalls, wall linings and floors gives Food Fair long-life insulating protection. That insures dependable, low cost refrigeration in such varied locations as an abattoir in Linden, N.J., a warehouse in Baltimore and supermarket cold rooms throughout the Baltimore-Philadelphia area. The excellent performance of FOAMGLAS in all these uses has led Food Fair to plan similar installations for their continuing expansion program.

Prove to yourself that *you*, too, can solve your insulating problems best with FOAMGLAS. Send today for a free sample and directions for six simple "desk top tests" that quickly demonstrate the valuable combination of qualities you get only with FOAMGLAS. Address . . .

Pittsburgh Corning Corporation

Dept. O-37, One Gateway Center
Pittsburgh 22, Pennsylvania
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PITTSBURGH® PC CORNING **also manufacturers of PC Glass Blocks**

With this test you can quickly prove to yourself the unique compressive strength of FOAMGLAS . . . which allowed Food Fair to use it even beneath load bearing floors. Send today for a FOAMGLAS sample and directions for six simple tests which demonstrate clearly its unique benefits.

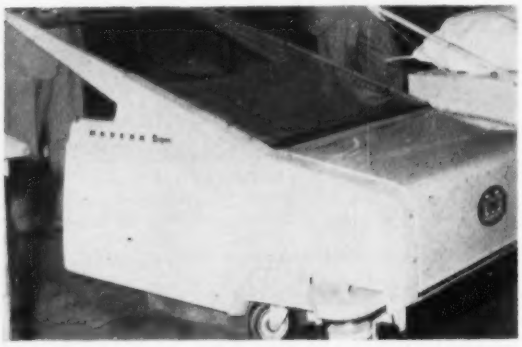
16 New Maintenance Units

Cleaning Machines

They speed and improve cleaning . . . simplify working routines . . . accelerate testing and tool jobs . . . modernize structures . . . step up control functions . . . and streamline office scheduling. Where they were spotlighted: 8th National Plant Maintenance & Engineering Show, Cleveland

▲ **FAST DUMPING** features this vacuum-equipped power sweeper that covers 54-in. path. Unit has 42-in. brush-plus-vac system, works in aisles as narrow as 5 ft., and has 100,000 sq.ft./hr. sweeping capacity (open areas). At touch of lever, twin hydraulic cylinders lift dirt hopper and dump loads up to 800 lb. —G. H. Tennant Co., Minneapolis. (122A)

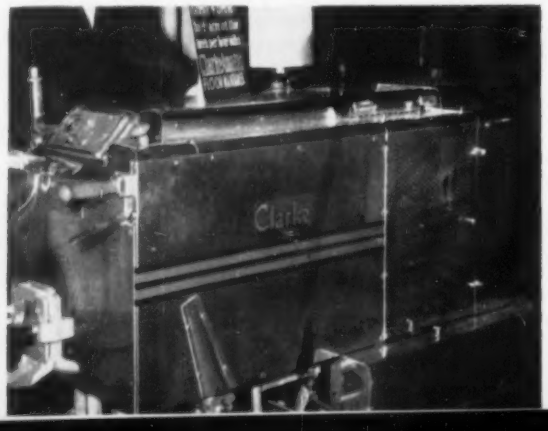
▲ **ELECTRIC SWEEPER** works 8-hr. without a recharge. And when one is needed, it's simply a matter of plugging line into any 110v. outlet, since unit has built-in charger. Machine has variable 3-speed transmission and two motors—one for travel, other for powering brushes and vacuum. Low center of gravity, balanced weight, and chain drive make for best traction and safety.—Wayne Mfg. Co., Pomona, Calif. (122B)



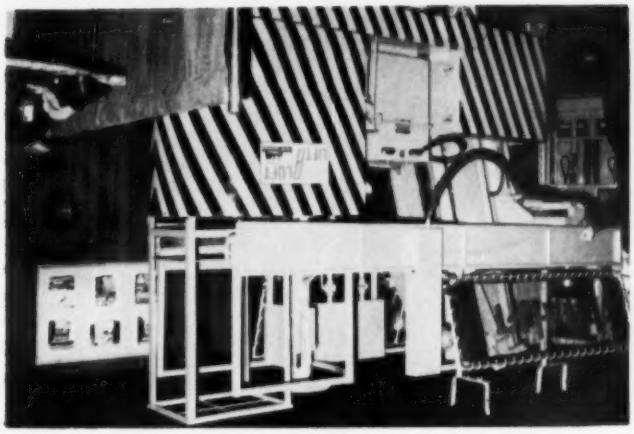
▲ **NEW SWEEPERS** (gasoline-driven) come in models having main brushes to swath 36- and 48-in. paths and cover 80,000 and 100,000 sq. ft. hourly. Special side brush, for cleaning walls and curbs, add addition 11 in. to swath. Units have front dump hopper and positive dust control, with newly designed dust bag. Panels are of Fiberglas.—Modern Power Sweeper, Azusa, Calif. (122C)

▲ **THIS STEAM CLEANER** is high-pressure unit for one- or two-gun operation. It has 180 gal./hr. capacity for this type cleaning. Other models offer up to 480 gal./hr. flushing and rinsing capacity. Features: Self-cleaning burner; long life, low maintenance pumps (solution and water); independent fuel pump with renewable filter and self-adjusting check valves.—Homestead Valve Mfg. Co., Coraopolis, Pa. (122D)

▲ **SCRUBBER-DRYER** covers up to half acre of floor an hour. Gas or electric-powered, it automatically meters solution, scrubs, rinses, picks up, then dries. Models have two speeds, double-size vac tank, 26- or 30-in. brush spreads, and large clean-water tank, also headlight for dark areas—Clarke Sanding Machine Co., Muskegon, Mich. (122E)



Lifting Platform, Dock Unit



▲ **COMPACT ELEVATING PLATFORM** is designed for overhead maintenance in narrow aisles. After raising (it works heights to 20 ft.), platform swivels full 360 deg. Self-propelled, this unit contains 24v. power supply, 32-gal. water system for cleaning, lighting facilities with fluorescent-tube racks, and electric outlet for operating d-c tools or vac cleaner.—Lift-A-Loft Co., Muncie, Ind. (123A)

▲ **SHIPPING DOCK PROTECTOR,** for both rail-car and truck facilities, is special all-weather unit. Controlling vehicle and room temperature and safeguarding perishables, it helps speed loading, unloading. Structure's frame work is galvanized square steel tubing, and fabric employed resists fire, water, and mildew.—Frommelt Industries, Dubuque, Iowa. (123B)

Tester, Tool, Paint

▲ **NEW BEARING TESTER** comprises electrified screwdriver-form probe hooked to compact amplifier. Detects and measures wear in bearings, gears, spindles, or slides without disassembly of machinery. Helps keep equipment running at established performance standards.—Sperry Products, Inc., Danbury, Conn. (123C)

▲ **NEW ABRASIVE SAW** is compact, lightweight tool designed for on the-job portability. It will cut 2-in. steel pipe in 6 sec. and 4-in. steel channel in 11, thus saving working time.—Collins Machinery Corp., Los Angeles. (123D)

▲ **THIS PAINT** that combines graphite and aluminum withstands almost 1,000 deg. F. of temperature. For coating smokestacks and other surfaces subjected to high heat, it produces an exceptionally thick protective film.—Jos. Dixon Crucible Co., Jersey City, N. J. (123E)

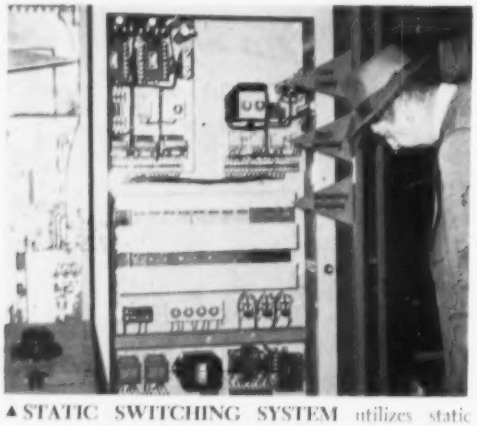
For detailed data on units circle key number on Reader Service Card in back of book

Continued ➡

Plastic Panels

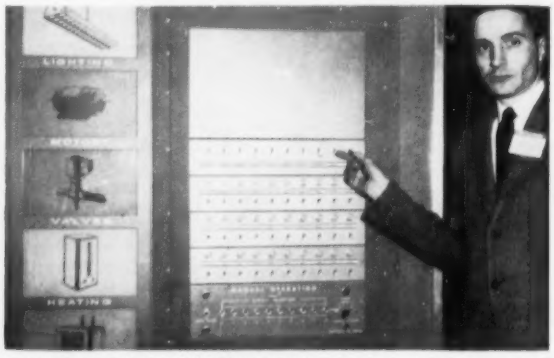
▲ **REINFORCED PANELS** to resist weathering are made from new type acrylic-modified resin. This tough plastic provides new durability for general glazing, skylights, awnings, building facades, etc.—International Molded Plastics, Cleveland. (124A)

▲ **NEW MESHED PANELS** are light in weight, yet provide high impact strength. Here, aluminum mesh is embedded in translucent Fiberglas-plastic. Other panels are offered with steel web. There is a variety of colors, also fire-resistant types.—Resolite Corp., Zelienoble, Pa. (124B)



▲ **STATIC SWITCHING SYSTEM** utilizes static magnetic and solid-state devices to control functions normally performed by contact-making devices. There are varied switching combinations, allowing long and short delays, also "And" and "Or" operations. Benefits: Reduced downtime, simplified automation circuits, reduced inspection and replacement, and greater flexibility.—General Electric Instrument Control Dept., Roanoke, Va. (124C)

Central Control, Master Switching



▲ **ELECTRONIC SUPERVISOR"** controls electric functions in remote locations (predetermined programs). It provides automatic regulation of up to 40 groups of remote operations—each on its own time schedule—without special control wiring. New system switches lights on or off, starts and stops motors, opens and closes valves, and performs scores of similar operations from central control panel.—International Business Machines Corp., N.Y.C. (124D)

Automatic Office Systems

◀ **MECHANIZED** file-desk (Robot-Kardex) provides visible indexing and signalling, with pushbutton positioning of each record. Any of 60 slides is available in about 4 sec. Reportedly saves average posting clerk minimum of 30% of time. Its 4,020 visible indexed sets of 5x8 records need only 13½ sq. ft. of floor space. Exhibitor: Remington Rand Div. of Sperry Rand Corp., N.Y.C. (124E)

▲ **SCHEDULING BOARD** (Sched-U-Graph) visualizes both planned work and performance through variety of colored signals and operation cards. Work (planned and done) is related according to time factors. Scheduling changes require only minor adjustment of cards and signals.—Remington Rand Div. of Sperry Rand Corp., N.Y.C. (124F)

... Any way you look at it, Vulcan is your best source for steel pails and drums.

Full open head and closed head pails are available from Vulcan's huge warehousing facilities for prompt shipment in all popular styles from 1 through 15 gallons, whether you need a carton or straight or mixed truckloads or carloads. For protective interior linings, pouring equipment, special container designs or Brand Name lithography ... you can depend on Vulcan to meet your rigid specifications.

Call or write today for test samples and complete information.

over 40 years container experience

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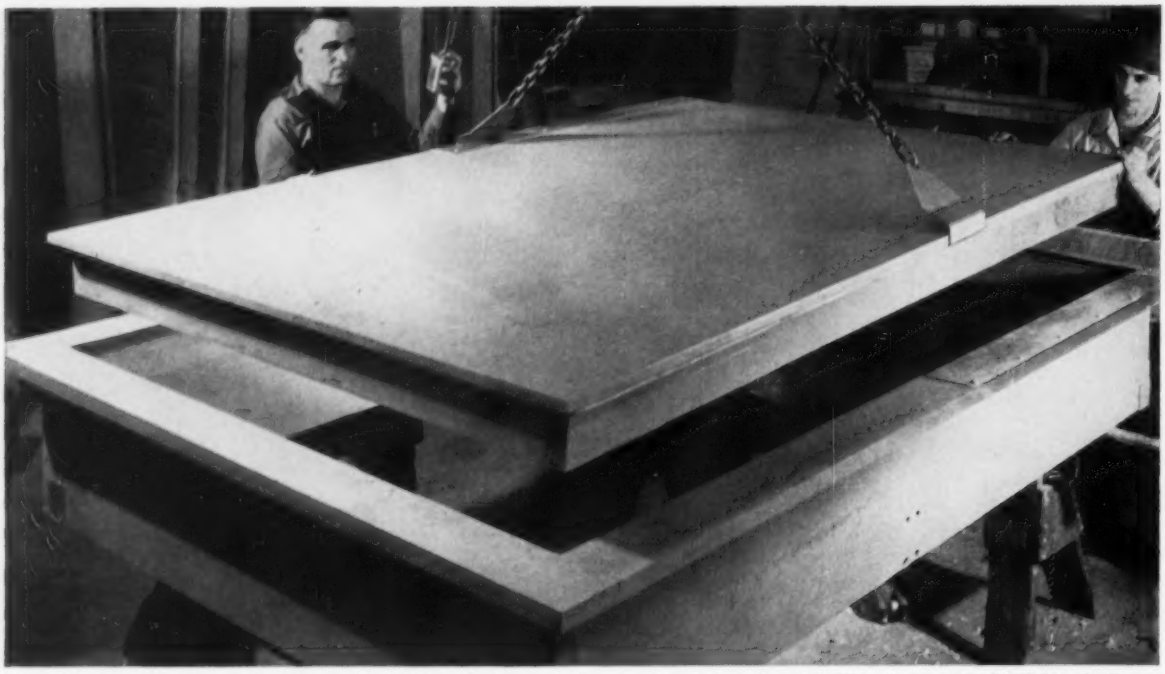
Bellwood, Illinois (Chicago Suburb)
Phone: Linden 4-5000

In Canada:
Vulcan Containers Ltd., Toronto 15, Ontario

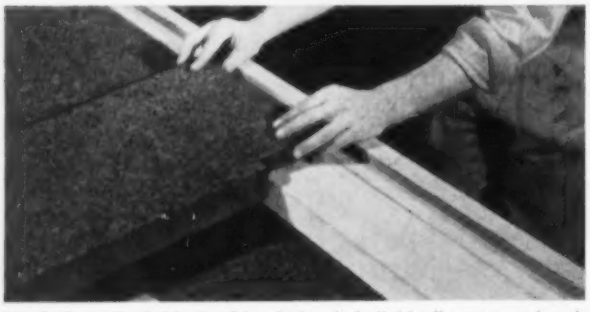
(See "Pails" in Classified Phone Directories)
Representatives in all Principal Cities

For more data, circle this page number on card at back →

Inside and out...Jamison cold storage doors show *quality* construction



Box girder construction of highest quality boat hull plywood gives maximum strength and rigidity. Large series "50" door is shown as door and frame meet on assembly line.

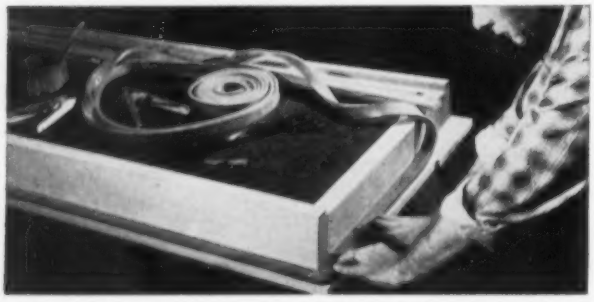


Insulation—Each block of insulation is individually measured and cut to give maximum insulation efficiency.

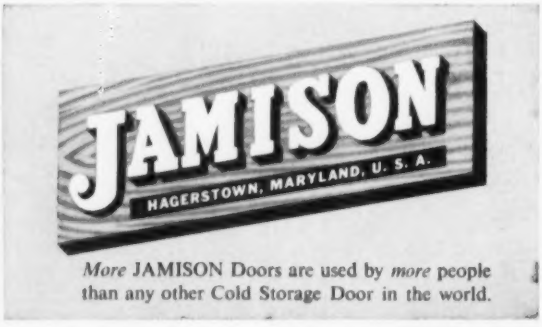
Materials and workmanship assure top efficiency in rugged service

The reason behind the reputation of the Jamison Series "50" Cold Storage Door is apparent here. Some of the most important parts and components are never seen by customers... Yet operational efficiency in all types of installations continues to prove that Jamison quality materials and precision workmanship mean superior protection and overall economy.

If you have plans for modernization or expanding, first get the story on Jamison's Series "50" Door. Write for your copy of Section 3. Jamison Cold Storage Door Co., Hagerstown, Md.



Tight Seal is assured by carefully applied gasketing. Gasket is soft sponge rubber resistant to acids, oils and greases.



More JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.

"C"-Enriching Tips For Cost-Watchers

More and more labels read "Vitamin C Enriched" as this additive comes out of the premium class . . Here are an expert's pointed details on ways to put it into foods

H. C. AITKEN
Food Technologist, Canada Vinegars, Ltd., Toronto, Ont.

IF YOUR PRODUCT can be improved with vitamin C, today is an excellent time to consider using it. For this important additive has now become more economical on the supply level.

Evidence of the new "economy appeal" is offered by Canada's 1956 apple juice pack. Fully 90% of the approximately 1,600,000 cases were vitaminized—dwarfing the earlier one-third figure in the days before the treated juice was lowered from premium to regular price.

This represents quite a high consumption of vitamin C by the juice processors—considerably more, in fact, than that claimed on can labels, since a certain amount must be figured as lost during processing and storage.

Three Fortifying Procedures

Major methods in current vitaminizing of apple juice include adding: (1) Crystalline asorbic acid to juice before pasteurizing, (2) concentrated solution to juice as it is pumped from the pasteurizer, and (3) ascorbic acid to apples at the grinder before pressing.

Briefly, the techniques are as follows:

(1) Dissolve vitamin in a small quantity of apple juice and add to a larger batch. To prevent oxidation losses, juice should be filled within 30 min. Agitation by bubbling an inert gas (nitrogen) through the batch, or gentle submerged mixing, minimizes incorporation of air.

Proper amount of vitamin to add has to be determined by actual practice. But if a residue of 35 mg. of vitamin C per 100 cc. juice is desired, then about 8 oz. ascorbic acid per 120 gal. should be used as a starting point. Adjustments can then be made following accurate tests of residual vitamin C content. There should also be an allowance for an average storage loss of 10 mg. per 100 cc.

(2) Metering concentrated vitamin solution to juice as it passes through a pipe to the pasteurizer and filler is the most flexible and precise of all vitaminizing methods. But the equipment is fairly expensive.

A typical installation includes a meter in the juice line that actuates a special pump injecting accurately measured volumes of solution into the juice as it flows past.

Micrometer adjustment of stroke on injection pump allows precise dosing with vitamin C. Pump speed depends on the volume of juice, insuring that a uniform quantity of vitamin is added. And vitamin content can be set by adjusting either (a) concentration in the injection solution or (b) stroke of the pump.

PRECISE GAGES of vitamin content in your product are primary. The author is seen carrying out a check on vitaminized apple juice.

(3) Spraying a concentrated solution on apples as they are ground up before pressing is the basic method for producing a "natural" or "opalescent" juice. The ascorbic acid retards browning of apple tissue and resultant juice is light in color, stable, and has little tendency to settle out.

Apples containing large amounts of enzymes able to destroy vitamin C need more vitamin, and accordingly tend to run up costs. Therefore, very careful supervision is required to control this type of vitaminization.

A fourth method—adding vitamin tablets to containers before filling—is now chiefly employed for experimental packs. However, in the early days of vitaminizing (around 1940), this technique was used in regular production by almost all plants.

Vitamin-Loss Factors

In the presence of oxygen, vitamin C will disappear from fortified juice. Even the oxygen from air trapped in hermetically sealed cans will expend itself in reaction with the vitamin. This is generally attributed to the action of peroxides formed when oxygen reacts with juice enzymes.

Further factors contributing to loss of the vitamin are manufacturing conditions, kind of apples, condition of fruit, container, closure, season, and temperature and duration of storage.

Accordingly, initial fortification must be at a level sufficient to offset such losses, and so assure a final product containing the amount of vitamin claimed on the label. —*End*

NOW 3 SUPERIOR CORN SYRUP SOLIDS

carry the OK BRAND of QUALITY

1. OK DRI-SWEET 42 D.E.—(Coarse)
2. OK DRI-SWEET 42 D.E.—(Powdered)
3. OK DRI-SWEET Low D.E.—(Powdered)

for Better Conditioned, Finer Flavored Foods

OK DRI-SWEET 42 D.E. (COARSE) is especially suitable for seasoning comminuted luncheon meats, smoked, cured and preserved meats. It is colorless, reduces watering off, cuts shrinkage, improves texture, is a better binding agent and can be used in greater quantity for maximum fill.

But, whether you produce prepared meat products, dry food mixes, frozen foods, ice creams, soup mixes . . . if you want finer flavor, better texture, controlled moisture, increased solids, and improved shelf life . . . *if you want quality at no extra cost* . . . you can get it with the OK BRAND DRI-SWEET Corn Syrup Solids. In fact, *only* OK DRI-SWEET Corn Syrup Solids provide a combination of *so many advantages in a single conditioner-seasoner.*

Write today for detailed data on how OK DRI-SWEET Corn Syrup Solids can help you improve your production, or phone for a Hubinger Food Products Technician. You'll find him and the Hubinger Customer Research Service OK too.

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SAVINGS in both weight and space are accented in this new plastic van for frozen and refrigerated food shippers.

Refrigerated Volume Boosted With

Molded Plastic Truck Body

"Sandwich" of plastic and wood combines light weight with rugged durability.

LIGHT YET STEEL-STRONG, a molded plastic truck body is now offering processors these big advantages:

- More load space
- Less need for insulation
- Reduced maintenance

Among processors using the plastic body vehicle is Plankinton Packing Co., a division of Swift & Co.

Made by Heil Co., Milwaukee, the 12-ft. truck body is called Frigid-Van. It is the result of two years of extensive experimentation with the patented Frigid-Lite plastic molding process.

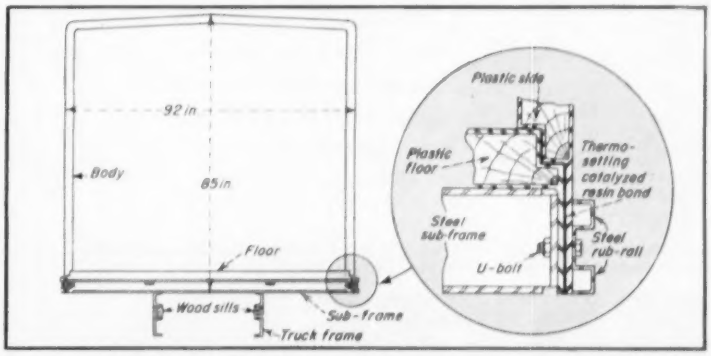
The new body is fabricated in much the same way as the Dairylea plastic milk tanker (FE Oct. '54, p. 98). Unlike the tanker, however, it has no stainless steel liner.

The front, top, sides, and rear are molded in one piece. The floor is molded separately and attached to the rest of the body by hermetically sealing with plastic resins, and with mechanical fasteners.

The body is designed for mounting on any truck with a cab-to-axle dimension of 84 in. and gross vehicle weight of from 12,500-16,500 lb.

Weight of the body varies from 2,300-2,400 lb., including the subframe, flooring, and bumper, but not refrigerating equipment. Comparable-volume steel or aluminum bodies, as used in the meat packing field, have been ranging from 3,600-4,100 lb.

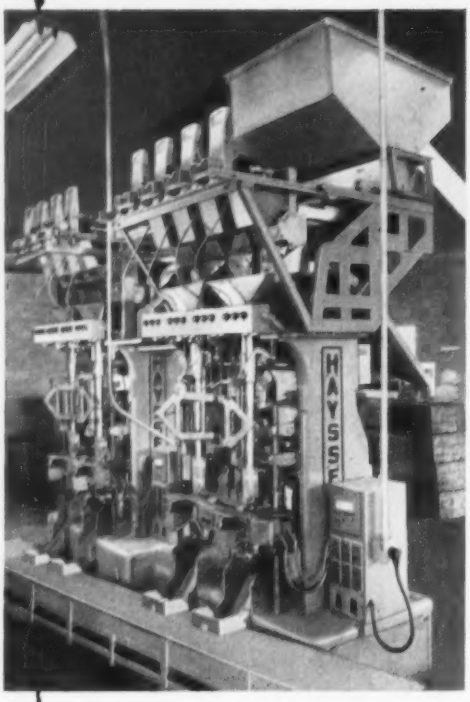
The molded floors, walls, ceiling, and doors incorporate 2 in. of balsa



CONSTRUCTION FEATURES of new body are seen in cross-sectional view (left). Detail drawing (right) gives closeup revealing manner sides are joined to floor. Note use of both bonding and bolts.

COMPAK

high-production "Poly" Packaging continues to set new records for performance and economy!



Gressinger & Sons have produced over 25,000,000 perfect Polyethylene packages of radishes in one year's time on these two Hayssen COMPAK machines.

● No other packaging machine on the market can boast this record of production and dependability with polyethylene.

Whatever your product; solid, liquid or powder, we can produce a better package at less cost.

The simplified machine principle of COMPAK has made it first choice in every industry where perfect design register, accuracy and a true hermetically sealed package is necessary.

Let our experienced packaging engineers help you with your polyethylene packaging problems. Contact us TODAY and see how easily COMPAK fits into your operation.

HAYSSEN

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wood insulation sandwiched between inner and outer layers of Fiberglas reinforced plastic. The structural strength is strong enough so that frames and braces are not required, eliminating the possibility of metal-to-metal thermal conductivity. Thus provided is a rustproof, vapor-tight barrier.

An aluminum diamond-tread wear plate is attached to the floor (other surfaces supplied on request). The plate is bonded to the floor.

Door frames are molded with the body proper and cut out later. The doors are double-hinged and are 20 in. wide.

All wiring is plastic coated—molded into the van walls to give permanent protection. An interior light is standard equipment.

The body is equipped with a 12-gage corrugated steel rub rail and a steel diamond-tread rear step.

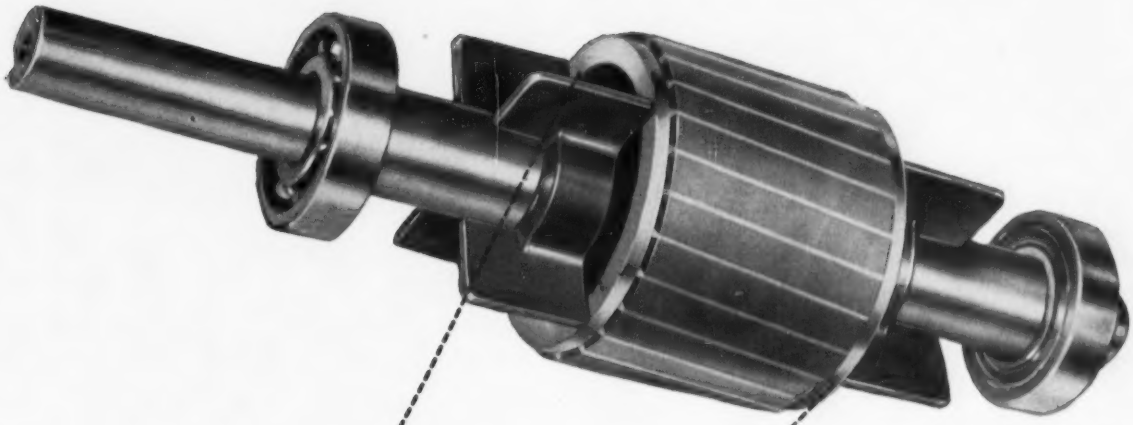
Construction permits installation of either entectic solution plates or any type of mechanical refrigeration. Apertures are cut in the body to meet the purchaser's specifications. The Plankinton Packing Co. uses two Dole, 700-lb. hold-over plates. One plate is mounted on each side of the body.

Unless otherwise specified, the van has a white color impregnated during molding.

It is stated that pricewise the plastic body will cost about 15% more than the standard metal body.

Optional equipment includes side doors, wheel housings, and meat rails. Side door measurements are 28x64 in. Wheel housings, when provided, lower the floor 6¾ in. —*End*

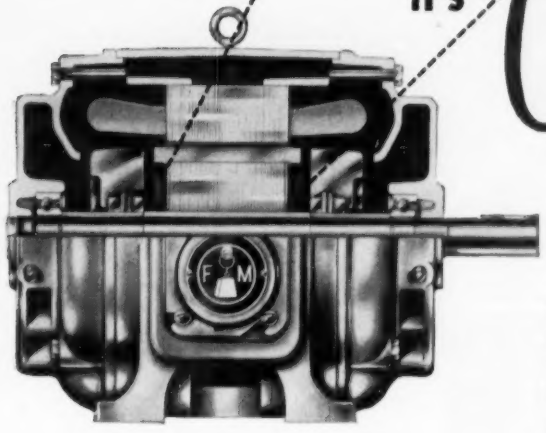
"But think of it, Al—we'll score a first with canned sea-serpent!"



When you want motor performance

You want this Rotor design...

it's Copperspun



Long life, stamina and high efficiency—made possible by the Copperspun rotor found only in Fairbanks-Morse polyphase squirrel-cage induction motors.

Before specifying motors for sustained, heavy-duty drives, compare designs of the all-important rotor.

Fairbanks-Morse Copperspun rotors have the mechanical strength and the superior electrical and thermal characteristics of copper. Compare these advantages against aluminum or white metal alloys. Exclusive F-M method of centrifugal casting produces a truly one-piece rotor that is homogeneous, free from flaws and gas inclusions—virtually indestructible. It is accurately machined and dynamically balanced for longest trouble-free service on the toughest application.

The Copperspun rotor and the Fairbanks-Morse standard of quality manufacture make it more than worth your while to get in touch with the motor specialist from Fairbanks, Morse & Co., Dept. FE-3, Chicago 5, Ill.

FAIRBANKS-MORSE

a name worth remembering when you want the BEST

ELECTRIC MOTORS AND GENERATORS • DIESEL LOCOMOTIVES AND ENGINES • PUMPS • SCALES • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

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Eight minutes cooking at 260° F, five minutes cooling, five minutes for loading and unloading conveyor. On the panel, a Honeywell indicating pressure controller and a recording temperature controller closely regulate the process.

Cans of corn are agitated end over end to assure thorough cooking. Retort pressure is automatically controlled by a Honeywell instrument during the cooling stage to prevent buckling of cans.

Finished product flows from the *Agi-Tort* as more cans go in. Besides cutting cooking time from one hour to 8 minutes, the Honeywell-controlled *Agi-Torts* produce a superior product. Green Giant merchandises the operation as its "New Fresh-Flavor Process."

Green Giant

processes corn seven times faster with Honeywell-controlled retorts

AFTER ten years of experimentation, the Green Giant Company has developed a high-temperature, short-time method of processing whole kernel corn in institutional packs. The success of this process is due to *Agi-Tort** agitating retorts, and the accurate temperature and pressure control by Honeywell instruments.

Sixty times a day at Green Giant's plant in Watertown, Minnesota, two Honeywell-controlled *Agi-Torts* cook and cool 304 seventy-five ounce cans of corn in 17½ minutes—one-seventh the time required by previously used still retorts. Moreover, the company reports customer enthusiasm over the improved product quality achieved by the new process.

In this operation, where speed and accuracy of control are essential, Honeywell temperature and pressure instruments were the logical choice. These instruments have gained outstanding recognition in *every* phase of food processing.

In your own process, instrumentation by Honeywell can lead to new economies and product quality improvements. Your nearby Honeywell sales engineer can show you how. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.—in Canada, Toronto 17, Ontario.

H HONEYWELL

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BROWN INSTRUMENTS

First in Controls

**Trade name registered by the Chain Belt Company*

Using Salt Efficiently

by **INTERNATIONAL SALT COMPANY, INC.**—America's largest producer of salt

Salt Dissolvers, Brine Storage Units Now Available in Corrosion-Proof Plastic

Here's important news for every user of salt brine. In response to a growing demand for equipment that will not rust or corrode in use, International is now offering fully automatic plastic dissolvers for both rock and evaporated salt—as well as plastic storage tanks for brine. Already in use in many plants, these plastic units give the same fine performance as International's metal equipment, with this important added feature: they are 100% corrosion-proof.

To select the correct plastic for these new units, International's researchers conducted an exhaustive series of tests. These tests showed that a fiber-glass-reinforced polyester is most suitable for the job. Made of this material, the new plastic units will stand up, with strength to spare, when loaded to full capacity.

The reinforced plastic used in this new equipment is completely unaffected by any chemical action of salt or brine. Because of this feature, there can never be any rust specks in the brine, and there is no danger of contaminating the brine's flavor or color.

Durable, long-wearing . . . In addition to being corrosion-proof, the plastic in International's new equipment has another important advantage. It is

LOOKING DOWN into the new plastic dissolver. Shows simple, rugged construction . . . float for liquid level control . . . circular pipe for admitting water into dissolving chamber.

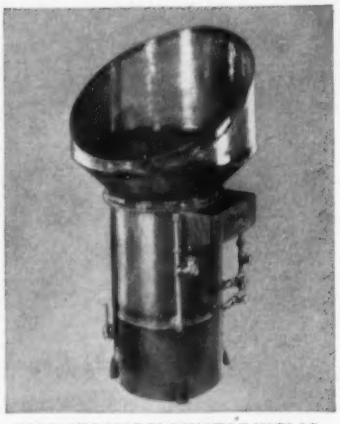
unusually strong and durable—has one of the highest weight-strength ratios known today. In fact, during one testing procedure, a plastic brine storage unit was loaded with over 3,500 lbs. of coarse rock salt—and showed no deformation anywhere. Furthermore, this plastic will not dent or chip even under the severest conditions. As a result, years of trouble-free service are expected from these new units.

Sturdy construction is used throughout the dissolvers and storage tanks. For example, the points at which pipes or couplings enter the units are even stronger than the units themselves. Here, a new resin cement has been used to provide a tough, lasting bond between connections and tank walls.

Other features . . . The dissolvers and storage tanks—being made of plastic—need no painting or other maintenance. The units are especially light in weight, making installation or moving a simple job. And because they are translucent, the true brine or salt level is always visible.

Two types of salt dissolver available . . . For making high-quality brine from rock salt, the Sterling Model Lixator is available in plastic. This unit is a duplicate of International Salt Company's famous metal Lixator—and operates on exactly the same principle. Crystal-clear, fully saturated brine for all plant uses is made automatically by the Lixator—and can be delivered automatically to all points of use from the Lixator.

Also available in plastic is the Sterling Evaporated Salt Dissolver for making brine from different types of evaporated salt. Both these plastic dissolvers offer the same savings in labor, space, and salt as the same models made of metal.



STERLING MODEL LIXATOR IN PLASTIC. Widely used today for making Lixate Brine for water softening, canning, meat packing, chemical manufacture, etc.

The new plastic dissolvers are available in the same standard sizes as International's metal units. And the brine storage tanks in plastic can be made in sizes to meet a plant's specific requirements.

TECHNICAL SERVICE WITH YOUR SALT

Through skilled and experienced "Salt Specialists," International can help you get greater efficiency and economy from the salt you use. International produces both Sterling Evaporated and Sterling Rock Salt in all types and sizes. So we can recommend the type and size of salt most perfectly suited to your needs.

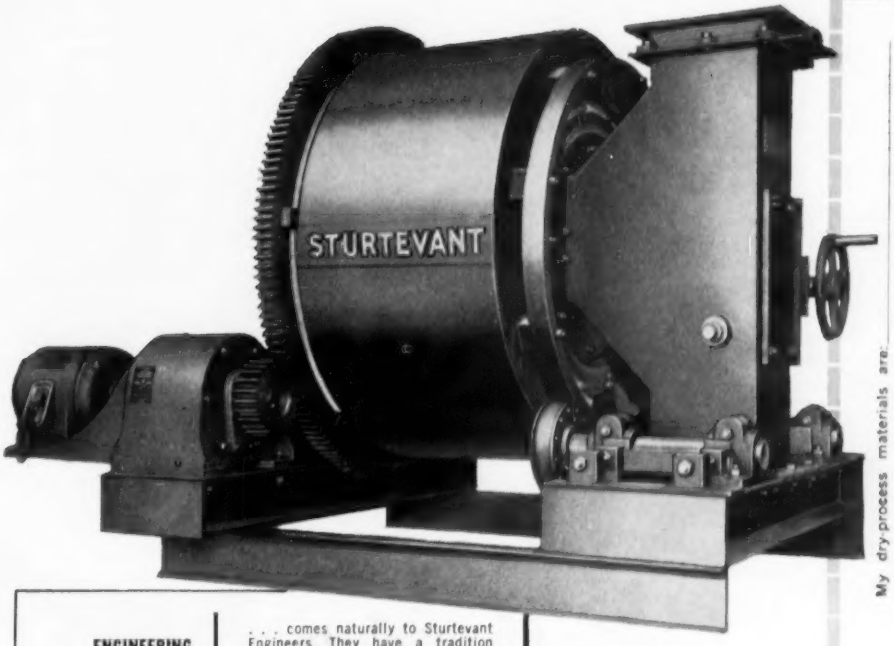
If you'd like the assistance of an International "Salt Specialist" on any problem concerning salt or brine—or further information on the new plastic equipment—just contact your nearest International Salt Company sales office.

International Salt Co., Scranton, Pa.

Sales Offices: Atlanta, Ga.; Chicago, Ill.; New Orleans, La.; Baltimore, Md.; Boston, Mass.; Detroit, Mich.; St. Louis, Mo.; Newark, N. J.; Buffalo, N. Y.; New York, N. Y.; Cincinnati, O.; Cleveland, O.; Philadelphia, Pa.; Pittsburgh, Pa.; and Richmond, Va.

FOR INDUSTRY, FARM, AND THE HOME—
STERLING SALT
PRODUCT OF INTERNATIONAL SALT CO., INC.

COSTS OF BETTER BLENDS CUT TWO TESTED WAYS



ENGINEERING BLENDING AND OTHER DRY PROCESSES TO SPECIFICATIONS

. . . comes naturally to Sturtevant Engineers. They have a tradition of solving dry-processing problems since 1873. Sturtevant custom-built equipment and plants are well-known for their low-maintenance-cost operation. If your problems include any of the processes listed on the coupon, it will pay you to investigate.

Sturtevant Dry-Batch Blenders:

1. **SPEED UP PRODUCTION WITH 4-WAY MIXING**
2. **SHORTEN SHUT-DOWNS WITH "OPEN-DOOR" DESIGN**

Batches from 500 to 40,000 pounds come out of Sturtevant Dry-Batch Blenders exactly as you want them. They are completely blended regardless of the varying weights, densities or fineness of the different ingredients. And no dust is lost in the process. **Four different vertical and lateral mixing actions** inside the sealed rotating drum achieve thorough blending in minimum time. Single lever control of a single gate speeds up loading and discharging.

"Open-Door" accessibility makes cleaning and maintenance a matter of minutes. This original Sturtevant advantage plus 75-year-tested rugged construction assures more output per machine-year. Check the coupon for more information.

STURTEVANT

Dry Processing Equipment

The "OPEN-DOOR" to *lower* operating costs over *more* years

CRUSHERS • GRINDERS • MICRON-GRINDERS • SEPARATORS
BLENDERS • GRANULATORS • CONVEYORS • ELEVATORS

My dry-process materials are: _____

Desired capacity is: _____

Name _____ Title _____

Firm _____

Street _____

City _____ Zone _____ State _____

STURTEVANT MILL COMPANY, 106 Clayton Street, Boston 22, Mass.

Please send me your bulletin on Dry Blenders ☐
Also bulletins on machines for:

☐ CRUSHING ☐ GRINDING ☐ PULVERIZING
☐ MICRON-GRINDING ☐ SEPARATING ☐ BLENDING
☐ SUPERFINE SELECTING ☐ GRANULATING ☐ CONVEYING

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From the Company that brought you Cellothene

Comes

NEW SUPER STRONG

Mylothene

The Film with a *Packaging Punch!*

Mylothene . . . the toughest member of the Ches-Laminate family of functional packaging films. *Mylothene*, a direct fusion lamination of DuPont's Mylar*—the strongest plastic film ever made—plus polyethylene *without* adhesives or binding agents. Result—a versatile, heavy-duty, packaging film with glittering brilliance and printability.

STRONG: *Mylothene is TOUGH . . . the ideal packaging film with resistance fused in to withstand rough handling without tearing. Shelf life and saleability are unlimited.*

CLEAR: *Mylothene is a glistening showcase for your product. Brilliantly transparent and sparkling clear—it prints easily in one or more colors on standard equipment.*

TEMPERATURE RESISTANT: *Mylothene remains stable even when subjected to temperature extremes created by flash freezing and boiling water.*

MACHINABLE: *Mylothene is adaptable to standard semi-automatic, automatic or heat-sealable packaging equipment for bags, pouches, overwraps, envelopes, windows.*

THERE'S A CHES-LAMINATE FOR EVERY PACKAGING NEED:

CELLOTHENE: Precision extrusion of Cellophane/Polyethylene

CHESLAM KB: Polyethylene Coated Kraft Bleached

CHESLAM KN: Polyethylene Coated Kraft Natural

CHESWRAP: Polyethylene Coated Sulphites (Bleached)

CHESROYALE POUCH: Polyethylene Coated Pouch Paper (Bleached SC)

CHESOPAQUE: Polyethylene Coated Glassine Opaque

CHESKLEER: Polyethylene Coated Glassine (Super Transparent)

CHESLAM VP: Polyethylene Coated Vegetable Parchment

CHESFOIL: Polyethylene Coated Foil Laminated to any of the above combinations

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KEEPING UP WITH THE FIELD

Announces Tubed Flight-Food

Development of a tubed meal—said to contain all of the basic carbohydrates, proteins, fats, minerals, and vitamins need in daily diet—is announced by National Research and Development Corp., Atlanta.

The nutrients, plus a cellulose gum for added bulk, are combined in semi-solid form and enclosed in a metal tube with a plastic cap that can be removed with one hand.

Aim of the development is a concentrated, weight-saving meal for long-distance military fliers. The company claims its discovery will reduce weight of the flight meals by 50%.

Ammonia Stems Fruit Rot

Decay in fresh citrus fruits is now being attacked at the source—the packing house—by Dr. Irving L. Eaks, U. of California, Riverside. The preventive treatment, which worked out well in experiments, involves pumping ammonia gas into the "greening" rooms, where fruit is brought to color.

The pilot studies, now underway, seek to determine commercial cost of the process. Preliminary work points to a figure of $1.00 per 1,000 boxes.

To Gage New Food Processes

Future developments in food processing and packaging will be scrutinized at a symposium sponsored by Midwest Research Institute, Kansas City, and scheduled for April 2-3.

Leading authorities have been invited to air their views on refrigeration and freezing, dehydration, dehydro-freezing, heat sterilization, irradiation, and chemical preservation.

Dairy Production Gains

Milk output at the farm hit 127-billion lb. in '56—a 3% jump over the previous record high of 123.5-billion lb. in '55, according to USDA.

This figures out to 2.07 lb. per capita, declares the agency, a 0.02-lb. gain over '55.

Penicillin Residue in Market Milk Spurs FDA to Regulatory Action

Aiming at complete elimination of all traces of penicillin from the Nation's milk supply, FDA proposes a maximum, single dose ceiling of 100,000 units of the drug in preparations used for intramammary treatment of mastitis in cows.

If the new limit fails to achieve this objective, FDA says it will consider an outright ban on use of the antibiotic as a mastitis remedy.

The action results from three coast-to-coast surveys, which disclosed the widespread presence of penicillin residues in market milk supplies—despite a Federal regulation, in effect since '51, that requires drug label to warn against selling milk taken from treated cows for the first 72 hr. after they have been innoculated.

Medical authorities have insisted that even trace residues of the drug can cause serious, allergic reactions in sensitive consumers.

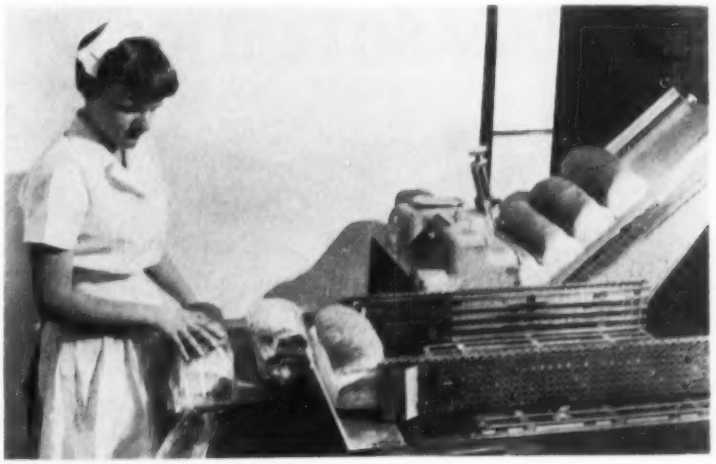
When penicillin preparations were first certified (1947), repeated doses of 25,000 units were considered adequate treatment. But now, many manufacturers have stepped up the dosage to 1,500,000 units, declares FDA. "There is no evidence that these massive injections increase clinical efficiency of the drug," adds the Agency, "and furthermore, their size increases the length of time required for the penicillin to be eliminated from the milk".

California Fish Canning Up

Production and sales of canned tuna and mackerel in California rose sharply in '56, according to the California Fish Canners Assn.

For tuna, sales hit about 10,000,000 cases—a substantial gain over the previous high, 8,300,000 cases, recorded in '53.

And the mackerel sales—on the strength of a near-record catch of 27,000 tons—are substantially ahead of the 593,000 cases packed in 1955, say the canners. Fishermen are turning their attention to this fish in view of the current sardine shortage, a cyclical occurrence blamed on oceanographic conditions.



Film Booms Bakery Sales

A polyethylene package has tripled bread sales for a Spokane, Wash., supermarket over a four-month period. The bag, made by Bakelite and Dobeckmun, is also used for rolls and cookies. Bread is wrapped as it leaves slicer (photo) and is said to be kept much fresher by the moisture-vapor-resistant film.

Irradiated Foods Approach Reality With New RAC Process

Progress is being made in development of a striking new food preservation method—radiation-aseptic-canning (RAC)—by HMV Corp., San Francisco, a pioneer in work with both radiation and aseptic canning techniques.

The RAC process comprises three major operations: First, product is pretreated to inactivate enzymes and minimize objectionable flavor changes during subsequent processing and storage. Next, product is passed continuously through a sterilizing radiation of high-energy electrons or gamma rays.

Excessive product irradiation is eliminated by cutting the dosages now necessary because of the walls and seams of containers and variations in depth of the product.

Final step in the revolutionary RAC technique is aseptic canning of the product to maintain complete sterility.

Food Algae Termed Costly

Large-scale cultivation of algae such as *Chlorella*—frequently proposed as a source of human food—would cost more than conventional crops, declare two Pfizer researchers in the *Journal of Solar Energy, Science, and Engineering*.

Basing their work on drug-production experience with molds at Chas. Pfizer & Co., Inc., Brooklyn, D. R. Thacker and H. Babcock assert that algae do not grow nearly as fast as molds. Regulation of light, supply of food materials, and processing complexities would further boost costs to about 48¢ per lb. The scientists noted that ground soy beans—another food substitute—now sell for 6¢ per lb.

Surplus Donations Soar

Domestic and foreign donations of surplus foods zoomed sharply during the first six months of the current fiscal year to total 1,415,700,000 lb., according to figures from USDA.

This is an 86% gain over the same period a year ago. Total distribution in this country amounted to 519,000,000 lb. (up 79%). Sharpest gain was posted in donations to the school lunch program—up 118%.

Uses Honey in Baked Goods

More honey for baked goods is the prognostication from USDA as a result of research just completed at Kansas State College, Manhattan. The sweet product, substituted in whole or part for normal sugar, enhances flavor, color and texture, state the scientists.

If more than one-third of the sugar is replaced, however, simple substitution of honey leads to intense browning and a burnt flavor and color.

This can be controlled by raising the acidity of the batter in the final stages of baking with potassium bitartrate coated with a stearate. As the fat melts, acid is released.

New "Balloons" Devised for Bulk Handling

Giant collapsible containers—now used by Bakelite to ship polyethylene resins to its converters—are seen to have wide possibilities for use in the food field. The special spheres have a load capacity of 300 cu. ft., can be stored outside, and collapse after unloading to a fraction of their full size. Special equipment has been devised for handling the units, which are scaled to fit standard rail cars and open-top trucks. The containers, made by U. S. Rubber, are made from polychloroprene rubber—impervious to moisture and grease.

New Daily Needs Posted For Niacin and Riboflavin

Establishment of the first, minimum daily requirement for niacin, and a reduction in the present minimum for riboflavin are proposed by FDA in an amendment to its dietary food regulation.

The projected ruling would fix adult needs for niacin at 10 mg. per day, and reduce riboflavin minimum from 2 to 1 mg.

Food processors will be allowed the choice of adjusting their formulas to meet the new order, or of continuing to put the same amount of vitamin in their foods as at present. However, in either case, labels will have to be changed to conform with the new daily requirements.

Win Safety Awards for '56

Outstanding safety records for 1956 have won citations for three, public refrigerated warehouses from the National Assn. of Refrigerated Warehouses.

The companies that operated for one accident-free year are: National Ice & Cold Storage Company of Calif., Watsonville; Terminal Ice & Cold Storage Co., Nampa, Ida.; Terminal Ice & Cold Storage Co., Salem, Ore.

Fishsticks Drop in '56

Output and sales of fish sticks took a nose-dive in '56. Production of the tasty seafood dish totalled 53,200,000 lb.—a 19% drop from '55 figures (65,400,000 lb.). This is the first time that this product has reversed its meteoric climb since its introduction in 1953.

Precooked fishsticks (46,300,000 lb.) accounted for the lion's share of the output in '56 (87%). The uncooked slices totalled 6,900,000 lb. (13%).

FAST STACKER

YALE *WORKSAVER* CUTS HANDLING TIME, SAVES SPACE IN COLD STORAGE ROOMS

Many frozen food firms rely on Yale *Worksavers* because these small electric trucks perform at top efficiency under severe temperature conditions. The constant change of temperature, caused by operating in and out of cold storage rooms, does not affect the fast and smooth performance of Yale *Worksavers*.

Moreover, Yale *Worksavers* maneuver easily in crammed quarters, allow greater use of space for storage purposes. To speed operation all controls are located within easy reach. For extra safety, brakes are applied and power is cut off the moment steering handle reaches full-up or full-down position.

Yale *Worksavers* handle up to 7,500 lbs. Pallet, tractor, platform and fork lift models. For complete information about the many advanced engineering features built into Yale *Worksavers*, send coupon today.

YALE*

INDUSTRIAL LIFT TRUCKS AND HOISTS

*REG. U. S. PAT. OFF.

MAIL THIS COUPON TODAY

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Please send me Bulletin No. 809C on Yale *Worksavers*.

Your Name_____

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In Canada: write The Yale & Towne Manufacturing Co. St. Catharines, Ontario, Canada

Gasoline, Electric & LP-Gas Industrial Lift Trucks • Worksavers • Warehousers • Hand Trucks • Hand and Electric Hoists

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When shoppers compare your products with other brands...

...CELITE FILTRATION provides perfect clarity... assures appetizing appeal

In today's highly competitive market, it is vitally important that processed food products *look* good as well as *taste* good. For in a shopper's eye clarity is often a measure of purity. That's why so many processors are turning to Celite* diatomite filtration.

By means of a filter cake hundreds of times finer than the finest wire mesh, Celite polishes liquids to a dazzling clarity. And it does it economically, too. Celite is low in cost. It provides practically automatic operation with any standard pressure filter. And you needn't worry about a clarification bottleneck. Celite works at fastest flow rates.

Thousands of processors are using Celite today for filtering sugar, beer, fruit juices and jellies, cooking and salad oils and many other products. Why not ask one of them about Celite. Better still, get the complete story from Johns-Manville.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products

When you filter your product with Celite you get the extra sales appeal of sparkling clarity.

Tell us what you make. We'll tell you if and how Celite can help you make it better. Write to Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

Johns-Manville CELITE FILTER AIDS

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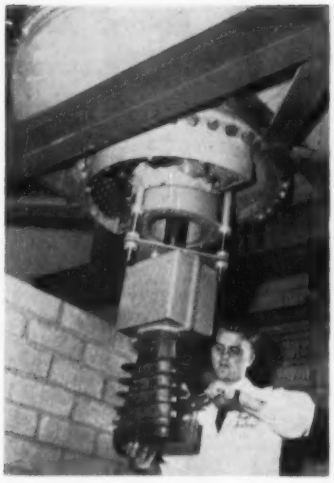

Expands Radiation Research

Stanford Research Institute, already the possessor of an electron beam generator and cobalt-60 source, has now added another machine (G.E.) to step up its facilities for nuclear research. This year's radiation program—budgeted at over $1,000,000—will delve into the peculiar affects that A-rays have on foods and plastics.

Ten Standard Pallet Sizes Proposed by Engineers

Standardized pallets that would ease the problems of packaging and handling foods may soon be a reality through the work of the Society of Industrial Packaging & Materials Handling Engineers, and the American Society of Mechanical Engineers.

These two associations have drawn up a comprehensive, tentative proposal that would cut the present diversity of pallet sizes (over 100) to about ten.

Principal objective of the study was to accomplish greater utilization of truck and rail car loading space.

The proposed ten standard sizes, declare the association spokesman, would accomplish this purpose and still accommodate the vast variety of packages and loading patterns used by industry.

Groundfish Imports Hit High

Imports of cod, haddock, hake, pollock, cusk, and ocean perch fillets and blocks reached a new record of 138,600,000 lb. in '56, according to Fish & Wildlife.

This tops the previous record year (1954) by about 1,100,000 lb.—and represents a 8,500,000-lb. jump over '55 imports.

Another example of STANDARD-HERSEY leadership!

**a specially designed self-aligning joint flange was developed which permitted the dryer to be installed in an "inaccessible" location.*

It's more than Standard Steel's routine of good design, quality materials and skilled workmanship that sells *Standard-Hersey* dryers... often it's the unusual engineering *ability to solve a difficult problem.* Time and time again new and old customers alike come to Standard Steel.

For more than 50 years, Standard Steel has developed dryers for many segments of American industry... handling difficult drying jobs with trouble-free, efficient and economical service.

No matter the drying job... nor how difficult the problem,

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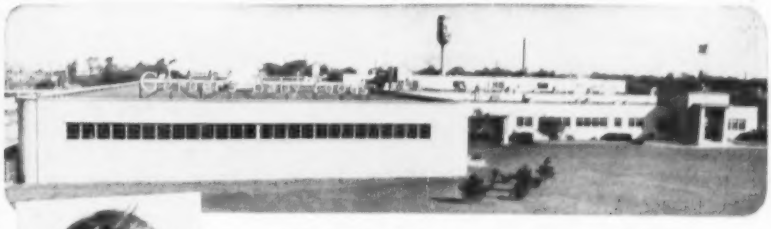
STANDARD HERSEY DRYERS

PILOT TESTING



GERBER'S BABY FOODS

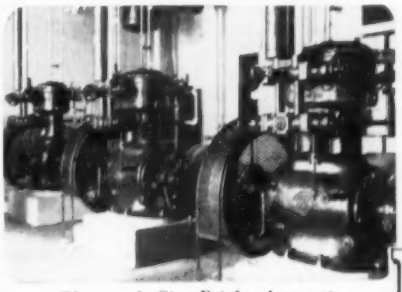
Made at Rochester with

Frick Refrigeration

These famous foods, described in the October Reader's Digest, are revolutionizing the feeding of youngsters.

We are proud to have furnished the cooling system for Gerber's new plant, where 500,000 jars of strained foods are packed daily. Installation (full-automatic) by Mollenberg-Betz Machine Co., Frick Distributors at Buffalo.

Specify Frick refrigeration, air conditioning, ice making or quick freezing for that important cooling system of yours. Literature and estimates on request: write today to



Three of Six Frick Ammonia Compressors at Gerber's.

DEPENDABLE REFRIGERATION SINCE 1883

FRICK CO.

WAYNESBORO, PENNA., U.S.A.

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COMPLETE SANITATION PROGRAMS *For All Food* PROCESSING PLANTS

★ **Tops for Tough Cleaning Jobs**

Klenzade "CBS" Cleaner is the finest industrial detergent available. Superb balance and high wetting agent content provide excellent soil penetration, fat emulsification, and free rinsing.

★ **High Temperature Cleaning**

Klenzade Flash-Klean is ideal for steam cleaning jobs. Strips "baked-on" soil residues quickly with the Klenzade Steam Cleaner.

★ **Controlling Mineral Deposits**

Klenzade Flash-Klenz removes and prevents lime film on canals, troughs, fillers, chutes, etc. Use the Klenzade Alternate System of Cleaning employing alkaline and organic acid detergents.

★ **Chlorine Sanitization and Water Treatment**

Use Klenzade XY-12 Liquid Sodium Hypochlorite for thorough fast action. Control-packaging in ready-to-use solution. No predissolving — no "pin-point corrosion." Choice selection of chlorine application equipment.

Plant Sanitation Surveys On Request

KLENZADE

"ALL OVER AMERICA"

KLENZADE FIELD SERVICE

A Klenzade field service technician will gladly call on you and help you plan a complete plant sanitation program.

KLENZADE PRODUCTS, INC.

Offices in Principal Cities

BELOIT, WISCONSIN

FDA Moves to Delist Four Tar Colors, Asks Test for Carotene Substitute

The long-anticipated delisting of four, yellow coal-tar colors has been formally launched by FDA. A proposed order banning use of Yellows 1, 2, 3, and 4 has been issued by the Agency following animal tests that showed the colors to be definitely injurious in excessive amounts.

FDA also announces plans for public hearings on the question of whether or not synthetic carotene—prime candidate to replace the banned coal tars—should be made subject to the safety standards of the Federal coal tar certification law.

Hoffman-LaRoche, developer of the synthetic carotene, seeks exemption from these standards. It claims that under the coal tar law, synthetic would require extensive pretesting—an unnecessary precaution, and one that would run up heavy expenses and hold up large scale use of the new coloring agent.

FDA staffers, however, are emphatic on the need for testing as a prerequisite for government approval of the product.

Canners Association Elects

A. Edward Brown, vice-president of Michigan Fruit Canners, Inc., was elected president of the National Canners Assn. for 1957 at the recent convention in Chicago.

Elected vice-president was Edward E. Burns, president of Alton Canning Co., Inc.

Carlos Campbell continues as the executive secretary-treasurer.

Expensive Packages Booming Say Industrial Designers

Elaborate—and expensive—packaging is here to stay.

Such was the consensus at a recent symposium conducted by the American Society of Industrial Designers and the Package Designers Council.

The reason for this trend, state the experts, is that the American housewife demands—and is willing to pay the price of—more and more convenience.

"Industry must meet this demand for more ingenious containers or lose out to competition," according to symposium speakers.

"To hold costs in line", added Industrial Designer Donald Deskey, "development of the package will move into the factory and become a part of the automated production line".

USDA Up-Dates Grading

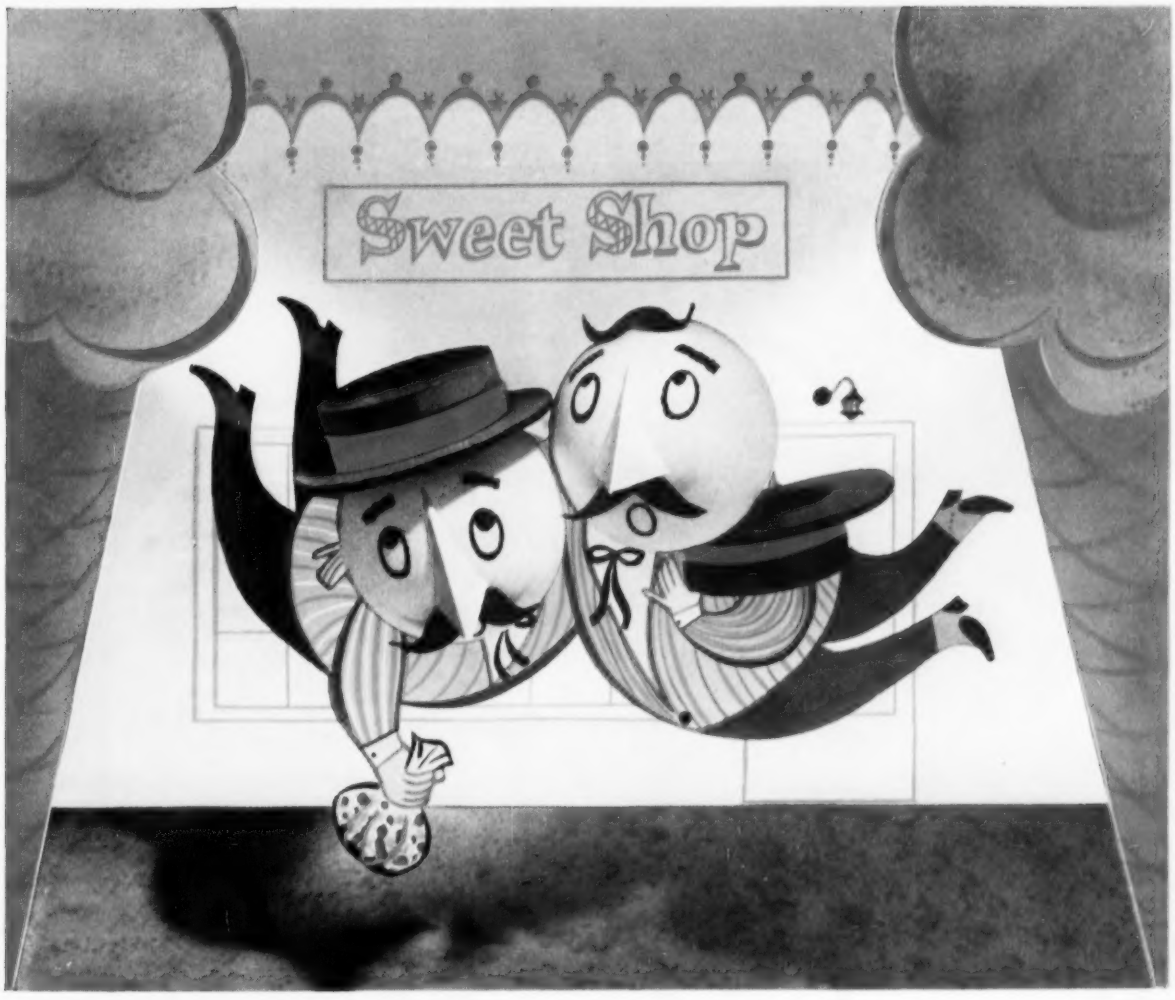
The Department of Agriculture has decided to change its long-standing views on inspection and certification of processed fruits and vegetables.

The proposed revisions, posted in the Federal Register, Feb. 8, 1957,

Orange Juice Tanker Completes Maiden Run

Carrying 650,000 gal. of fresh orange juice, the S. S. Tropicana sailed from Cocoa, Florida to Whitestone, L. I. last month to complete the first ocean-going shipment for this popular product. The juice, chilled and kept under vacuum during the 56 hr. voyage, was pumped ashore and cartoned in a new $2,500,000 plant, built by Fruit Industries, Inc. to serve twelve northern states and Canada.

DOW



Harmony for sweet sales:

Palatone and Cyclotene

Dow flavor intensifiers work well separately or together—giving added sales-appeal to ice cream, baked goods, candy and flavors!

Music to your ears! Referring, of course, to the sales reports you'll hear when you use Palatone® and Cyclotene® in your products. Both of these Dow aromatics accent flavor—and sales—appeal!

Palatone® is one of the rare flavor materials whose aromas closely resemble their tastes. Its distinct caramel-butterscotch odor emphasizes the sweetness of most blends. Palatone is also successful in compounding rich vanilla and chocolate flavors.

Palatone and Cyclotene® work very well together as flavor intensifiers. Cyclotene has a maple-licorice flavor, with a suggestion of walnut, which highlights the customer appeal of ice cream, baked goods, candy, tobaccos and peanut products.

Technical bulletins and samples are yours for the asking. You'll be sales ahead by writing on your letterhead to THE DOW CHEMICAL COMPANY, Midland, Mich., Dept. FC 869H-1.

YOU CAN DEPEND ON DOW

Jenni Genetron says: ***"When ordering refrigerants . . .***

Always Insist on genetron®

Super-Dry Refrigerants

By Name as well as Number"

. . . and you're sure of top performance—because Genetron refrigerants are *super-dry!*

Carried by leading wholesalers from coast-to-coast.

When you see your wholesaler, ask for—

genetron 11 ORANGE LABEL TRICHLOROMONOFLUOROMETHANE
genetron 12 WHITE LABEL DICHLORODIFLUOROMETHANE
genetron 22 GREEN LABEL MONOCHLORODIFLUOROMETHANE
genetron 113 PURPLE LABEL TRICHLOROTRIFLUOROETHANE
genetron 114A DARK BLUE LABEL DICHLOROTETRAFLUOROETHANE

Allied Chemical

GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
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eliminate present tables of minimum sampling rates. Instead, USDA will put into operation sampling plans that are based on modern statistical procedures.

Likewise, the process of grading processed products—heretofore based on certain tolerances for defects—will give way to an improved system for gaging acceptability of a particular lot of goods.

AMA Buys Research Center

A new educational and research center for top management has been started by American Management Assn. with its purchase of Trudeau Sanatorium at Saranac Lake, N. Y.

The famous rest home comprises over 60 buildings, located on a 90-acre tract in the Adirondack Mountains.

These will be converted by AMA for seminars and courses that will step up the Association's educational activity in industrial management.

BRIEFLY

• **EVAPORATED MILK,** now mostly processed under batch methods, can be sterilized with HTST techniques using a new preheating step worked out by U. of California scientists N. P. Tarassuk and A. F. Tamsma. The method avoids formation of gels—formerly a major defect with the HTST technique.

• **ORANGE JUICE** is now being packed in waxed paper tetrahedrons by Glenco Citrus Products, Inc., Anaheim, Calif. The 4-oz. package, marketed in the institutional trade for 10¢., is a Swedish invention called Tetra Pak (Crown Zellerbach Corp.).

• **FROZEN FOODS** must be checked for temperature at both shipping and receiving points, emphasises USDA in a new report on distribution of frozens. The study continues, by describing the installation of thermometers in the load, and stressing the care needed in checking them for accuracy. Marketing Research Report 150 can be obtained from USDA, Washington, D. C.

• **SUGAR** industry has established an advisory committee to work with USDA on defense planning problems and other factors affecting national welfare.

• **COFFEE** sales rose to 1.6-billion lb. in '56, a 1% gain over 1955 figures. Cans and bags of regular coffee took a slight drop, but instant coffee gained ground—representing 16.9% of all sales.

• **MARGARINE** men have set up a permanent committee with members of the Paraffined Carton Research Council to work out problems of packaging and shipping for their product, announces Siert F. Riepma, president of National Assn. of Margarine Mfrs.

Correction

Cellu-Craft Products Corp., mentioned in Creating the Package (Jan. '57, p. 19), is located in New Hyde Park, N. Y.—not New York City as reported.

In the article "Lightweight Cooling Unit Powered by Truck Engine" (FE Jan., p. 99) the system described was called "the first to use a hydraulic system" to run a refrigerating unit from the truck engine.

It has since been noted that a similar unit was designed by American Mfg. Co., Montgomery, Ala., and was installed in an Armour & Co. vehicle in 1954—thus giving this unit a prior claim.

Action on Standards

Following actions have been taken by the Agricultural Marketing Service (AMS) and Food & Drug Administration (FDA) on U. S. Standards and allowable tolerance of pesticides on raw agricultural commodities.

References are to the *Federal Register.*

Grape juice concentrate, frozen, AMS proposed U. S. Standards, *F.R.,* Jan. 11, p. 241.

Grape juice, concentrated, AMS proposed U. S. Standards, *F.R.,* Feb. 7, p. 760.

Asparagus, canned, AMS establishment of U. S. Standards, *F. R.,* Feb. 9, p. 805.

Cottage cheese, partially creamed, FDA Standard of Identity, *F. R.,* Jan. 10, p. 223.

On broccoli, brussels sprouts, cabbage, cauliflower, cherries, lettuce, spinach, and kohlrabi, proposed tolerances of diethyl diphenyl dichloroethane, *F. R.,* Jan. 17, p. 348.

Prune juice, canned, FDA Standards of Identity, *F. R.,* Jan. 18, p. 385.

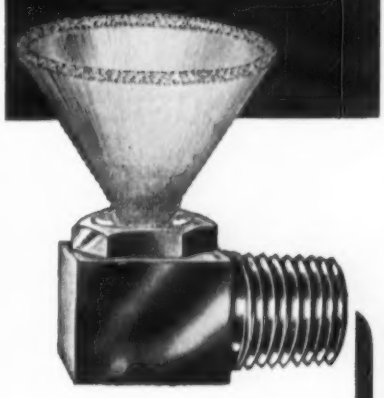
Mozzarella cheese, scamorza cheese, part-skim mozzarella cheese, and part-skim scamorza cheese, FDA Standards of Identity, *F. R.,* Jan. 23, p. 428.

Rice, enriched, FDA Standards of Identity, notice of time extension, *F. R.,* Jan. 26, p. 522.

American cheese food, FDA Standards of Identity, *F. R.,* Jan. 29, p. 581.

Orange juice, FDA standards of

LESS CLOGGING WITH Monarch



Any impurities small enough to pass through the orifice of this Fig. 629 nozzle will never clog the single large internal feed hole.

Monarch offers a full line of efficient, dependable, advanced design nozzles to . . .

- WAX FRUITS
- RINSE VEGETABLES
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Make Monarch NOZZLES standard equipment for all direct-pressure spraying.

Send for Catalogs 6A and 6C

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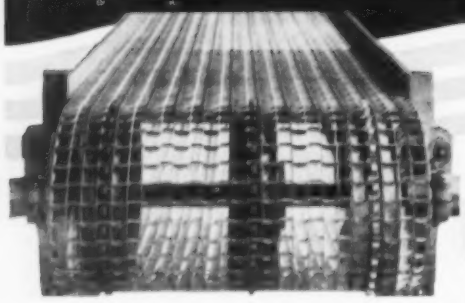
Protects FOOD QUALITY AND FLAVOR



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FLEXIBLE STEEL CONVEYOR BELTING

The hard impenetrable surface of the La Porte Belt will not pick up odors or off-flavors, cannot absorb oils or other liquids. Besides, it is easily and quickly sterilized with a steam gun or scalding water.

The open mesh feature, that permits free circulation of air and liquids around products in process, speeds up cooking and cooling, also provides free drainage and prevents waste accumulation.

Whether you are processing, packaging, shipping, or storing, this all-purpose conveyor belt will give you years of dependable, economical service. Available in ½" x 1" also 1" x 1" in any length and practically any width.

LA PORTE

Ask your Mill Supplier or write for illustrated literature, prices.

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New way to Code Cans, Jars, Bottles

Compact, portable attachment adapts to any line

The Gottscho "Model TB" MARKOCODER® machine is a unique, fully automatic, packaging line attachment for coding *bottoms* of cans, jars, bottles, canisters, paper containers at speeds up to 600 per minute. Makes consistently clean, permanent ink imprints. Designed for quick code changes, simple maintenance, easy adjustment for different size cans. Offers all the advantages of a fixed-installation imprinter without requiring alteration of present line set-up.

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Gottscho

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Dept. G, Hillside 5, N. J.

In Canada: **RICHARDSON AGENCIES, LTD., Toronto & Montreal**

Automatic Production-Line
CODING, MARKING, IMPRINTING MACHINES

identity, notice of time extension, F. R., Feb. 8, p. 789.

On almonds, brazil nuts, bush nuts, butternuts, cashew nuts, chestnuts, filberts, hickory nuts, peanuts, pecans, pistachio nuts, and walnuts, proposed tolerances of methyl bromide, F. R., Jan. 31, p. 643.

On sugar beets and sugar beet top, tolerances of 2,2-dichloropropionic acid, F. R., Jan. 31, p. 643.

On carrots, horseradish, parsnips, radishes, and salsify roots, proposed tolerances of Aldria, F. R., Feb. 8, p. 789.

On asparagus, citrus citron, grapefruit, grapes, kumquats, lemons, limes, onions, oranges, pineapple, spinch, sugarcane, tangelos, and tangerines, tolerances of monuron, F. R., Feb. 8, p. 786 .

Schedule of Events

March

18-20—Instrumentation Forum for Food Industry; Foxboro Co., Foxboro, Mass.
18-21—Society of Plastics Industry, annual conference & exposition; Hotel Biltmore and Shrine Exposition Hall, Los Angeles.
19-20—American Dairy Assn., annual meeting; Congress Hotel, Chicago.

April

31-A3—National Sanitary Supply Assn., convention & trade show; Conrad Hilton Hotel, Chicago.
1- 5—National Assn. of Refrigerated Warehouses, American Warehousemen's Assn., joint annual convention; Chalfonte-Haddon Hall, Atlantic City.
2- 3—Midwest Research Institute, symposium on food preservation; Hotel Muehlebach, Kansas City, Mo.
8-11—National Packaging Exposition & Conference; International Amphitheater, Chicago.
9-11—American Welding Society, annual exposition & conference; Convention Hall, Philadelphia.
14-27—U. S. World Trade Fair; Coliseum, New York City.
18-19—National Pickle Packers Assn, annual meeting; Drake Hotel, Chicago.
23-25—Conference on Interstate Milk Shipments; Hotel Peabody, Memphis, Tenn.
23-25—Research & Development Associates of Food & Container Institute, annual meeting; Jefferson Hotel, Richmond, Va.
25-26—Pennsylvania Mfg. Confectioners' Assn., annual production conference; Franklin & Marshall College, Lancaster, Pa.
27-30—National Fisheries Institute, annual meeting; Edgewater Beach Hotel, Chicago.
28-30—National Peanut Council, annual meeting; Hotel Fontainebleau, Miami Beach, Fla.
29-M3—Assn. of Operative Millers, annual technical conference & trade show; Statler Hotel, Buffalo, N. Y.
29-M1—American Oil Chemists' Society, annual meeting; Roosevelt Hotel, New Orleans.
29-M3—American Material Handling Society, conference & exposition; Convention Hall, Philadelphia.

PRODUCT NEWS FROM Pfizer

Now, Two Cost-Saving F. & D. A.-accepted Plasticizers

for cellulosics...

Compare PFIZER CITROFLEX* A-2

(Acetyl Triethyl Citrate)

The Food and Drug Administration has now accepted CITROFLEX A-2 for use in plastic food wraps—like the cellulose acetate food packages you see here. Nontoxic and odorless, CITROFLEX A-2 is accepted *for both fatty and non-fatty foods.* Most important to you, the cost of this citric acid ester is remarkably low, compared to other nontoxic cellulose acetate plasticizers.

for polyvinyls...

Compare PFIZER CITROFLEX* A-4

(Acetyl Tributyl Citrate)

CITROFLEX A-4 is also nontoxic, odorless and accepted by the F.&D.A. for use in plastic packaging of *either fatty or non-fatty foods.* You can use CITROFLEX A-4 to plasticize vinyl films for meat wrapping...vinyl coatings for food containers...vinyl plastisols for bottle crown liners, food jar sealing rings and "safe teething" vinyl toys. Compare the cost of efficient CITROFLEX A-4 with other *F.&D.A. accepted* vinyl plasticizers.

Besides A-2 and A-4, the Pfizer CITROFLEX line includes CITROFLEX 2 (Triethyl Citrate), CITROFLEX 4 (Tributyl Citrate) and CITROFLEX A-8 (Acetyl Tri-2-Ethylhexyl Citrate). Check into the Pfizer CITROFLEX plasticizers today. Mail the coupon below.

*CITROFLEX is a trademark of Chas. Pfizer & Co., Inc.

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Manufacturing Chemists for Over 100 Years

CHAS. PFIZER & CO., INC.

Chemical Sales Division

630 Flushing Ave., Brooklyn 6, N. Y.

- ☐ Please send me Technical Bulletin 31 on Citroflex Plasticizers
- ☐ Please send me a sample of CITROFLEX A-2
- ☐ Please send me a sample of CITROFLEX A-4

Name_____

Position_____

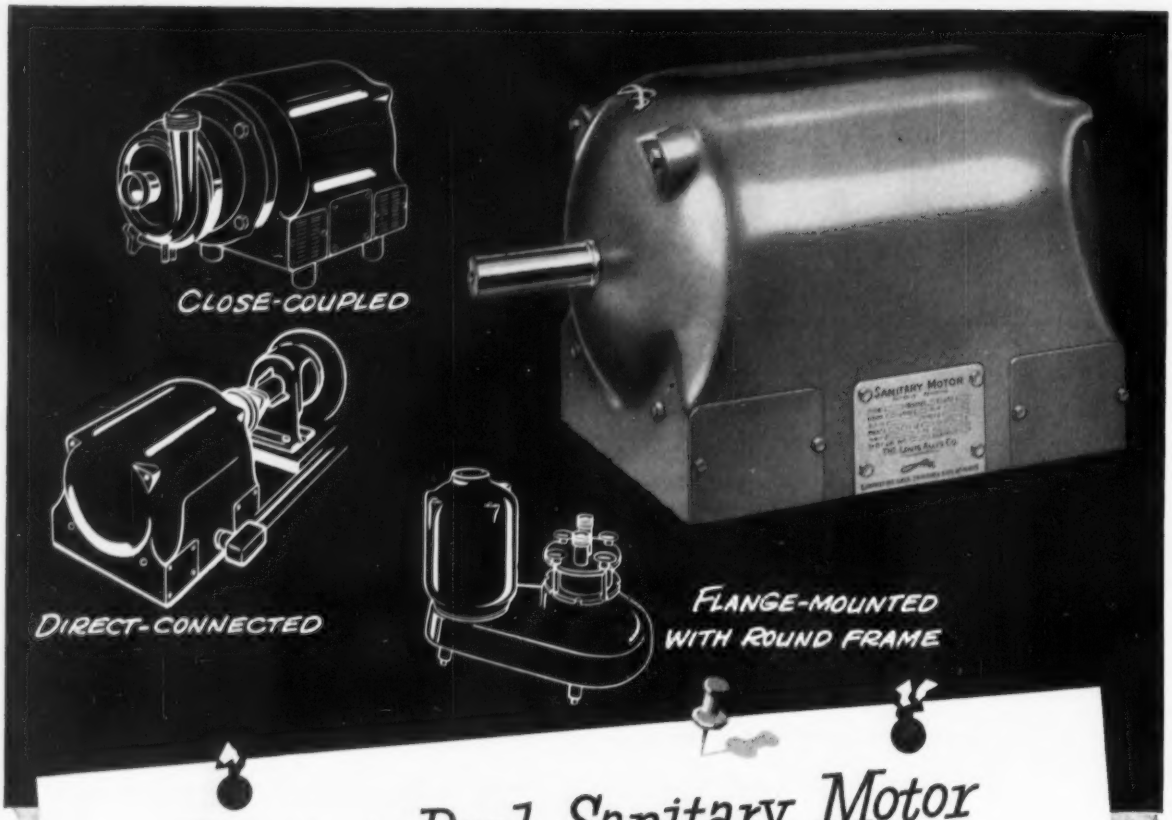
Company_____

Address_____

City_____ Zone_____ State_____

E

Branch Offices: Chicago, Ill.; San Francisco, Calif.; Vernon, Calif.; Atlanta, Ga.; Dallas, Tex.



Here's a Real Sanitary Motor You Can Install Anywhere

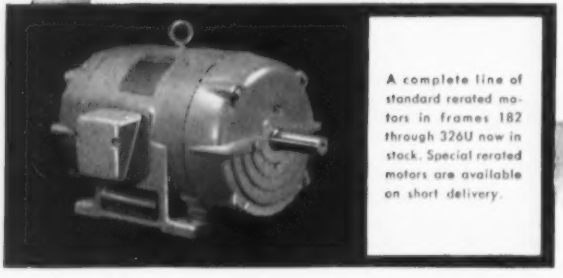
...designed and built by Louis Allis, it is splash-proof, vermin-proof, and streamlined

The Louis Allis Sanitary Motor is built to meet DISA specifications. It's completely streamlined—has smooth contours without cracks, crevices, or depressions to collect food particles. It's easy to clean and even has a built-in conduit box for the greatest possible sanitation. And it's versatile in three important ways:

1. Louis Allis makes it in a wide range of sizes and mechanical modifications to suit any application: Sizes from 1/3 to 40 hp. "C" flanges. Round frames. Special shafts and shaft extensions.
2. Because this motor is completely splash-proof, you can wash it down with a hose—no water can enter the motor to cause winding damage. Install it wherever falling or splashing liquids are present.
3. It can be installed in many ways, too. It can be close-coupled, direct-connected, or flange-mounted with round frame.

With all this versatility, you can put it anywhere—for maximum sanitation throughout your plant.

Your Louis Allis field engineer will be glad to help you with any installation problems—just ask him. Write us for Bulletin 711 describing this motor in detail.



A complete line of standard rerated motors in frames 182 through 326U now in stock. Special rerated motors are available on short delivery.

SY-101

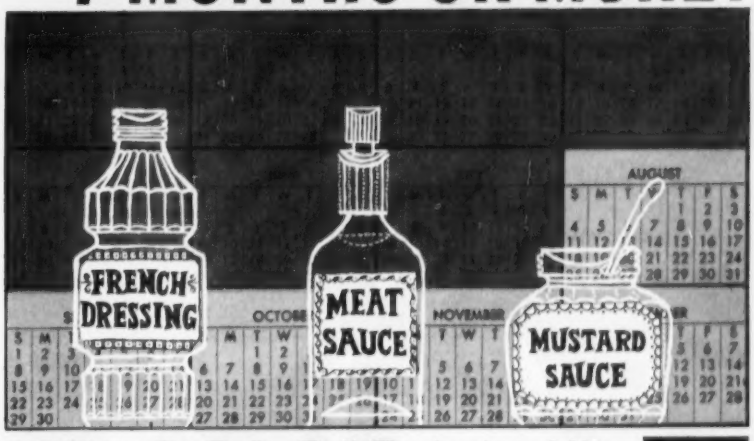
THE LOUIS ALLIS CO.
MILWAUKEE 7, WISCONSIN

Rebuild Razed Cannery

IN BUILDING Northwest Canning's plant (story p. 112) these men and companies played important roles.

Architect—*John F. Jensen, Portland, Ore.*
Can conveyors—*Martin J. Wilcox Co., Portland.*
Canning machinery—*John Albertoli Co., San Francisco.*
Canning machinery——*Food Machinery & Chemical Corp., Portland.*
Canning machinery—*James Q. Leavitt Co., Seattle.*
Case packers, gluers, sealers—*Standard Knapp Co., Portland, Conn.*
Conveyors—*Oregon Handling Equipment Co., Portland.*
Electrical contractor—*Ace Electric Co., Portland.*
Electrical engineer—*Fritz Klawa, Portland.*
Electrical supplies—*General Electric Co., Construction Materials Div., Portland.*
Electronic can ejectors—*Illuminitronic Engineering Co.*
Emergency packing facilities—*Carnation Co., Hillsboro, Ore.*
Emergency packing facilities—*National Fruit Canning Co., Seattle.*
Emergency warehouse facilities—*United Chemical Co., Inc., Portland.*
Engineering services & machines—*American Can Co., Portland.*
Full-can handling equipment—*Busse Bros., Randolph, Wis.*
General contractor—*Andersen-Westfall Co., Portland.*
Labeling machines—*Burt Machine Co., Baltimore, Md.*
Mechanical contractors — *Widmer Plumbing & Heating Co., Portland.*
Motor controls—*Allen Bradley Co., Portland.*
Motors—*U. S. Electrical Motor Co., Los Angeles.*
Motors & pumps—*Dodge Mfg. Co., Mishawaka, Ind.*
Oil burners—*Campbell-Norquist Co., Portland.*
Plumbing supplies—*Crane Co., Portland.*
Power transmission equipment—*Link Belt Co., Portland.*
Process Engineer—*John Blakey, American Can Co., Portland.*
Processing Equipment—*Urshel Laboratories, Valparaiso, Ind.*
Regulating Instruments—*Powers Regulators Co.*
Sheet metal work—*Swan Island Sheet Metal Works, Portland.*
Sheet metal work—*Thompson Metal Fab. Co., Portland.*
Steel tanks & boilers—*McCulloch & Sons, Portland.*
Technical assistance—*National Canners Assn., Berkeley, Calif.*
Thermometers—*Taylor Instrument Cos., Portland.*

At last! Positive way to SOLVE INSTABILITY of food emulsions -- 7 MONTHS OR MORE!



KELCOLOID hydrophilic colloid

KELCO REFINED ALGIN PRODUCTS

lengthens shelf life of French and Salad dressings, meat and barbecue sauces

You produce stable and uniform emulsions of superior flavor release and natural color with Kelcoloid. This easy-to-use hydrophilic emulsifying colloid improves consistency, gives smoother textured dressings of higher gloss.

for French dressings:

Extensively used in French dressings, Kelcoloid gives greater emulsion stability and markedly increases shelf life. Even when dressings are subjected to either high transit and storage temperatures, or refrigeration, Kelcoloid protects against body breakdown and separation.

for salad dressings and food spreads:

For softer, smoother texture add Kelcoloid to produce a desirable body that resists cracking and oil separation even on long standing.

for barbecue, meat, seafood, and mustard sauces:

With Kelcoloid you produce a properly stabilized product with optimum body and clean full flavor. Shelf life is increased for Kelcoloid maintains uniform emulsions longer.

For finer food emulsions Kelcoloid is well worth your immediate evaluation.

YOURS ON REQUEST: Free Kelcoloid Sample and Technical Bulletin, fully describing application of Kelcoloid in food emulsions, yours without obligation. Write today.

KELCOLOID®
a product of **KELCO** company

120 Broadway, New York 5, N. Y.
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530 W. Sixth St., Los Angeles 14, Calif.
Cable Address: Kelcoalgin—New York

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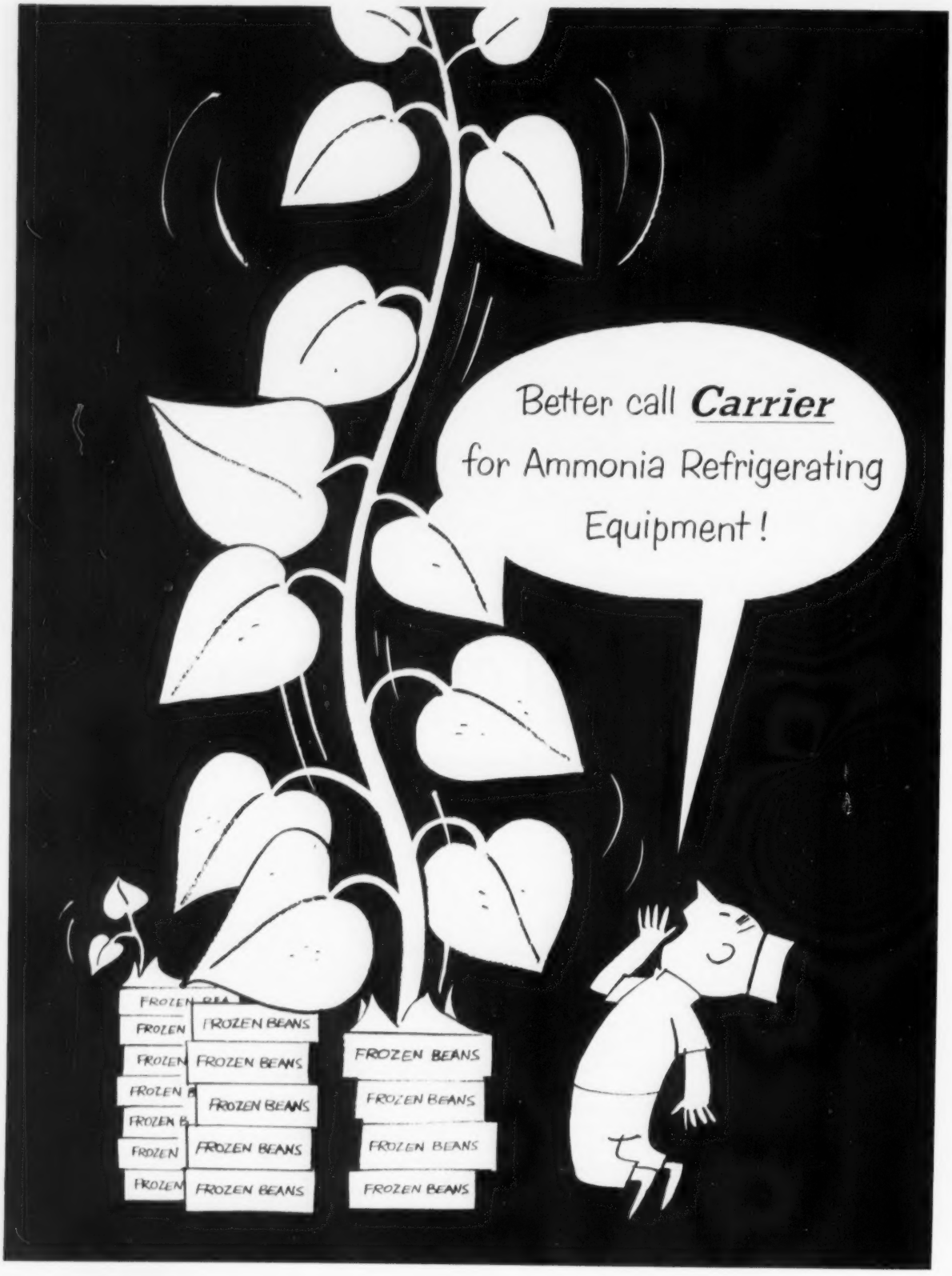

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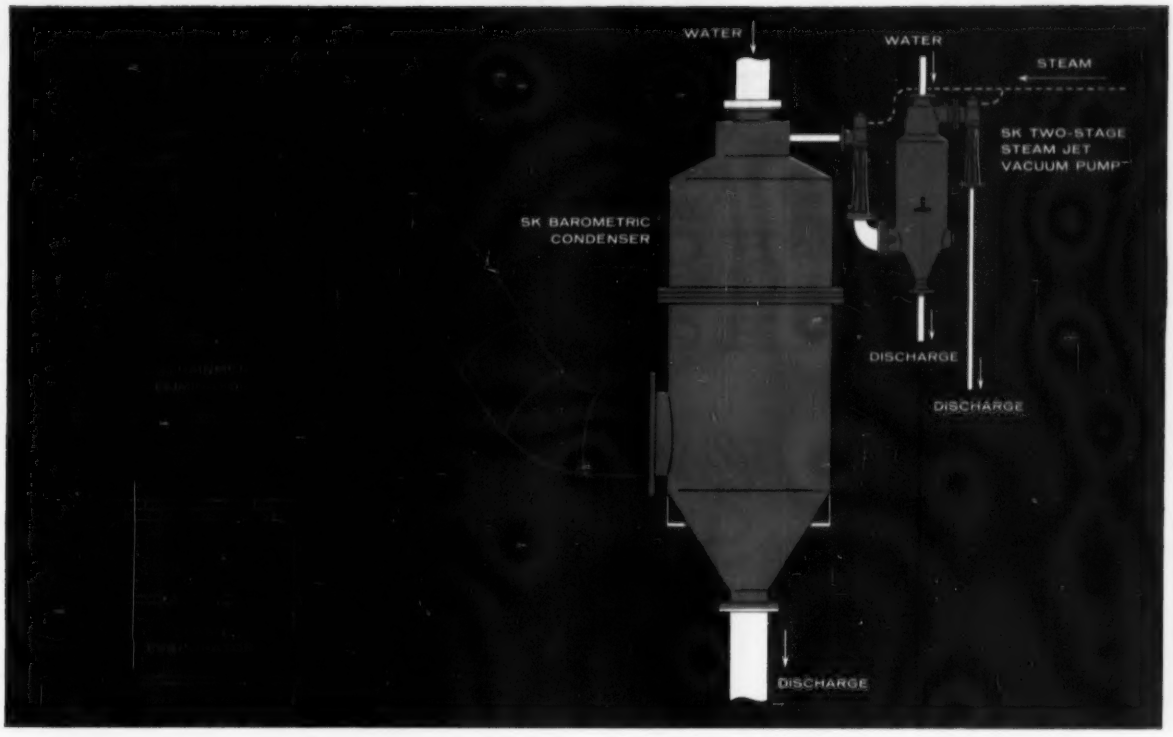
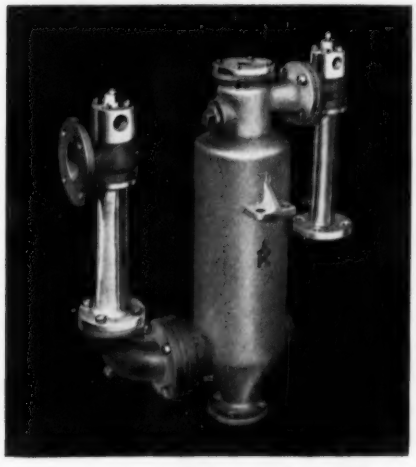


SK VACUUM PUMP HELPS BEVERAGE COMPANY

make better product at lower cost

SK Two-Stage Condensing Steam Jet Vacuum Pump



SK Steam Jet Vacuum Pumps utilize the kinetic energy of pressure steam to entrain and remove gases and vapors. Because they offer outstanding advantages—simple design with no moving parts, low initial cost, and long life expectancy with little supervision or maintenance—they have opened a whole new field for application in the food and allied industries.

A typical example is shown above. This is part of a refined, improved process developed by a popular beverage manufacturer for handling product. The two-stage steam jet vacuum pump illustrated consists of two exhausters with a barometric countercurrent intercondenser. It is used to maintain an absolute pressure of approximately 1 inch of mercury on a system consisting of a single effect evaporator together with an entrainment eliminator and an SK barometric counter-current pre-condenser. The condensable vapors are removed in the pre-condenser and the two-stage vacuum pump handles the non-condensable gases plus moisture of saturation. Two single-stage exhausters are used on a section of the process not shown to maintain vacuum on a deaerator and a holding tank.

The improved process is outstanding in increased efficiency and control of product. And the SK Vacuum Pump has helped make it so.

Many sizes of Vacuum Pumps are carried in stock by SK and are available for immediate delivery. For material on Vacuum Pumps and for information on other types of SK Jet Apparatus, write for a copy of Bulletin J-1.

JET APPARATUS: Ask for Condensed Bulletin J-1.
ROTAMETERS & FLOW INDICATORS: Ask for Condensed Bulletin 18-RA.
VALVES: Ask for Condensed Bulletin V-1.
HEAT TRANSFER APPARATUS: Ask for Condensed Bulletin HT-1.
GEAR PUMPS: Ask for Bulletin 17-A.

Schutte and Koerting
COMPANY
MANUFACTURING ENGINEERS
2223 State Road, Cornwells Heights, Bucks County, Pa.

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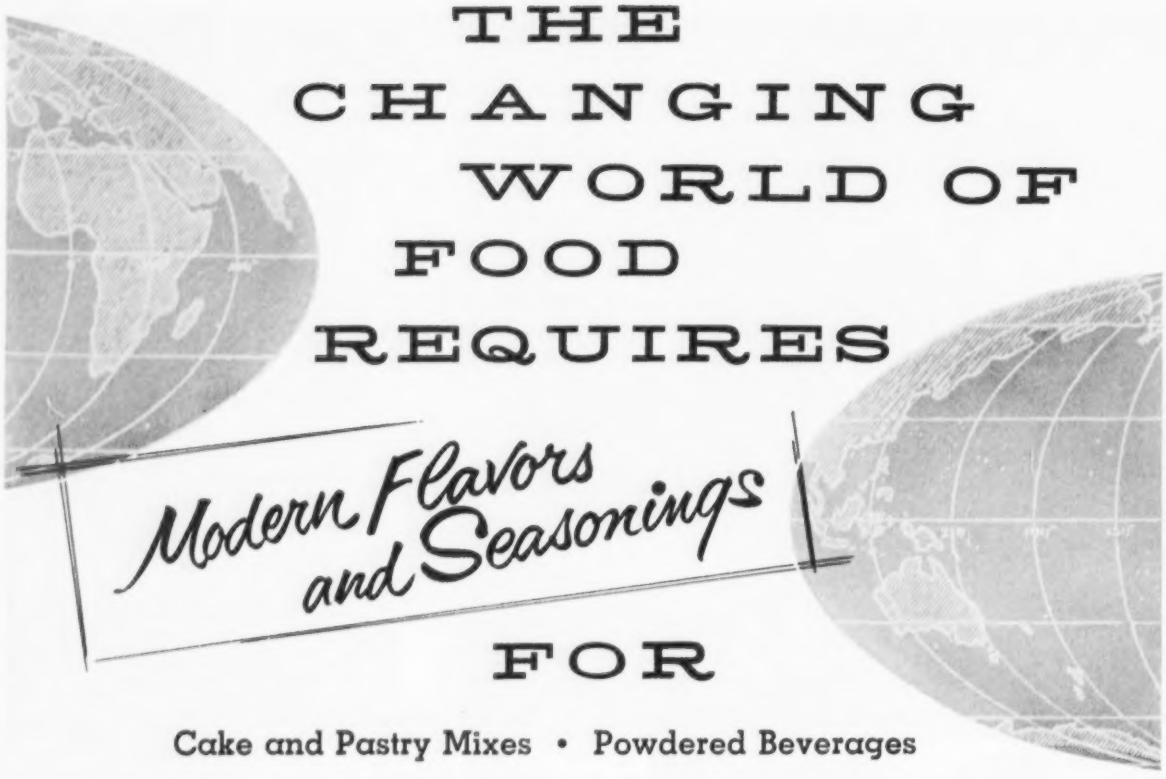
THE CHANGING WORLD OF FOOD REQUIRES



Modern Flavors and Seasonings FOR

Cake and Pastry Mixes • Powdered Beverages

Instant Pudding and Desserts • Frozen Foods

Dietetic and Low Calorie Products • Geriatric Foods

Ready-to-Eat Cereals • National Specialties

New Packaging and Preservative Methods • Aerosol Foods

Just as yesterday's processes and equipment will not turn out the specialized food lines and convenience items of today . . . so the flavors and seasonings that *sell* and *resell* these products must also keep pace with food technology. In the D&O Product Development Labs this balance is maintained, with the continual production of new or modified flavors and seasonings geared to the dynamic "Changing World of Food." Inquiries are invited.

Write for copy of the "Changing World of Food" booklet and "Reference Book and Catalog of Flavors and Seasonings.

Essentially for You

OUR 158th YEAR OF SERVICE

DODGE & OLCOTT, INC.

180 Varick Street, New York 14, N. Y.

Sales Offices in Principal Cities

D&O ESTABLISHED 1798

Perfume Bases
Essential Oils
Aromatic Chemicals
Flavor Bases
Dry Soluble Seasonings

New Hazel-Atlas research in glass puts three "Imps" to work for you . . .

Whether you pack food or beverage—three Hazel-Atlas "Imps" will produce more sales *im*pact, and more *im*pulse sales in beautiful new H-A containers like these.

Your foods' appetizing color and shape are salesmen with *silver tongues,* when you let them speak for themselves in a beautiful H-A container. For peanut-butter and cheese spreads—a complete H-A line of brilliantly decorated and plain re-use tumblers. Sparkling flint jars for baby foods, relish, olives and pickles, honey, vegetables and fruit.

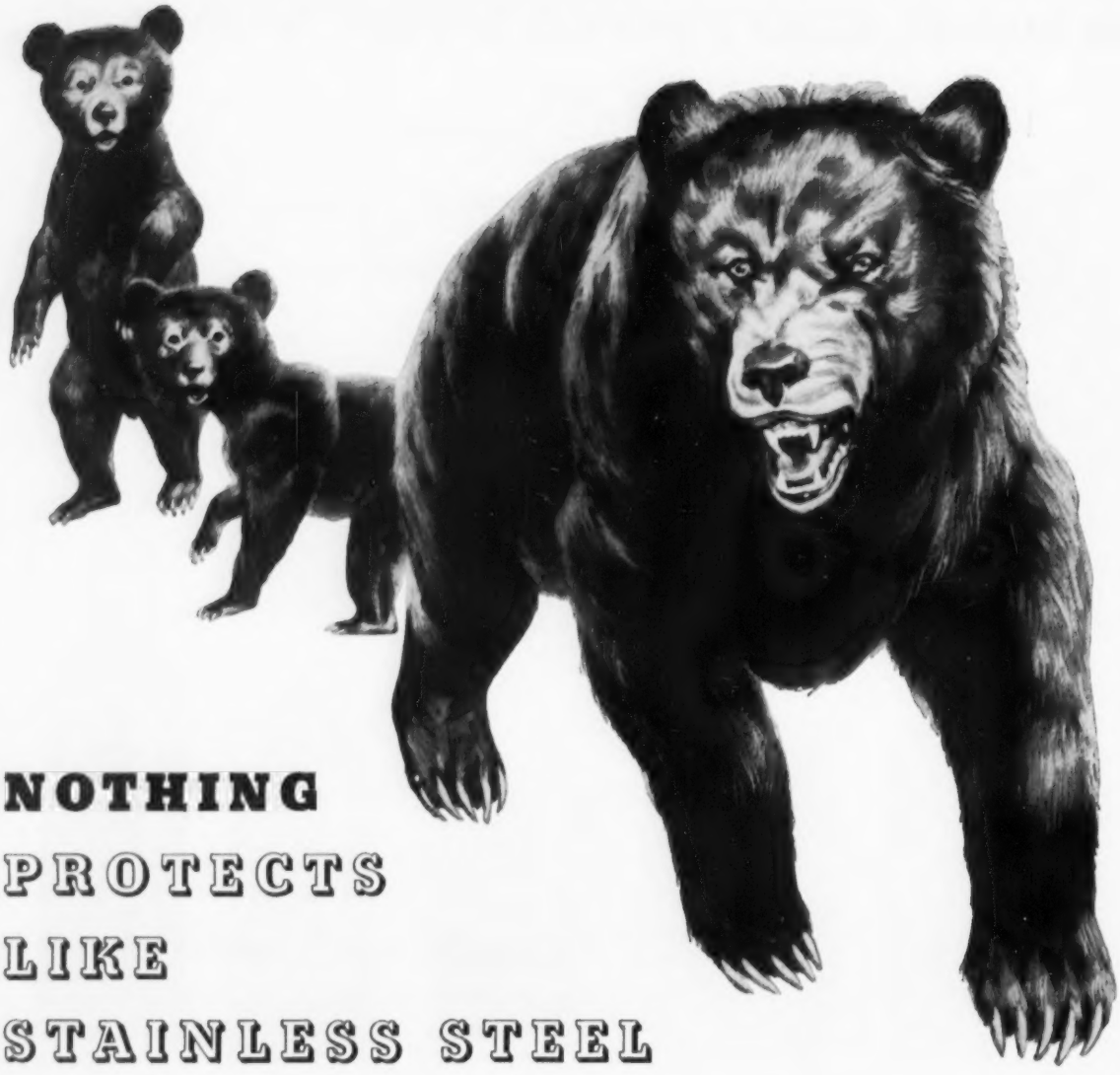
Rigid quality-controls keep your H-A containers uniform in size, shape, clarity and color. They perform efficiently on the filling line and display your product at its best. You are sure of fast, dependable delivery during sales peaks and emergencies, served by H-A's nationwide network of glass plants and warehouses. Ask your H-A representative or call your nearest H-A office, today.

...glamour in glass!

HAZEL-ATLAS GLASS

division of **CONTINENTAL CAN COMPANY**

WHEELING, WEST VIRGINIA



NOTHING PROTECTS LIKE STAINLESS STEEL

Write for your copy "STAINLESS STEEL for STORE FRONTS and BUILDING ENTRANCES"

If modernization or new construction is on your mind, this 40-page booklet contains many ideas on handsome treatments for you. (Note: A new booklet on "AL Stainless in Food Preparation and Serving Equipment" is in process—write for one of the first copies when available.)

ADDRESS DEPT. FE-87

In the world of products and equipment, just as in Nature, *protection* is the difference between a long life and a too-early end.

Many materials are good-looking. Some are strong. Some resist corrosion. But not one other commercially-available material offers the same combination of beauty, high strength, high hardness and resistance to corrosion, heat and wear that stainless steel can give you. Not one has the ability to protect as completely, last as long and cost you as little in the long run.

These qualities in AL Stainless Steel can boost the salespower of a product, or cut the operating costs of equipment—often with little or no increase in first cost. Very likely *you* have problems where these advantages can bring you benefits. Let us work with you. ***Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pennsylvania.***

WSW 5438 F

For Stainless Steel in ALL Forms—call

Allegheny Ludlum

Warehouse stocks carried by all Ryerson Steel plants

AL STAINLESS STEEL

MEN & COMPANIES

Personnel

Curry J. Bassett, Clair Hill, and **James E. Revell,** respectively, have been appointed plant managers in Borden Co.'s Miami, Tallahassee, and Fort Myers, Fla., plants.

Robert H. Bennett is newly elected v.-p. for marketing, and **Harlan Logan** is new v.-p. for development for General Foods Corp., White Plains, N. Y.

Myron L. Bloom, v.-p. of O'Donnell - Usen Fisheries Corp., Boston, is newly elected president of Glouchester Fisheries Assn.

Roland A. Casey has been appointed v.-p. for sales by Arnold Bakers, Inc., Port Chester, N. Y.

Walter R. Comfort, Borden Co., High Point, N. C., has been elected president of North Carolina Dairy Products Assn.

Glenn H. Copeland has been named operations v.-p. for Van Camp Sea Food Co.

Louis Csenge is new assistant v.-p. of the Borden Co., and president of Borden Co. Foundation, Inc. and **Douglas T. Orton** has been named director of the Foundation.

Dr. Ted Dubin is newly elected v.-p. and treasurer of Daitch Crystal Dairies, Inc., New York City.

O. F. (Ben) Elliott, regional manager of Cincinnati Div., American Bakeries Co., has retired after 35 yr. with the company. He is succeeded by Don Mendenhall.

Kenneth G. Garside has been appointed v.-p. in charge of finance by National Cranberry Assn., Hanson, Mass.

F. C. Hilker is newly appointed v.-p. in charge of advertising and public relations for Jolly Rancher, Inc.

Seymour Lusterman and **Neil A. Morrison,** respectively, have been elected v.-p. in charge of market research, and v.-p. in charge of plant design and engineering for Pepsi-Cola Co.

William L. Moran, Jr., is new v.-p. in charge of operations

To capable Dr. Roy C. Newton, V.-P. of Swift, goes the American Institute of Chem-

Dr. Roy C. Newton —*In Forefront Of Technology*

ists' outstanding honor—the 1957 Gold Medal. Cited is his "brilliant leadership in food technology."

A holder of many patents relating to stabilization, Dr. Newton is probably best known for discovering gum guaiac's antioxidant use in lard. Also, he has been instrumental in research contributing many scores of improved foods and processes.

The Doctor's new honor adds to an imposing list. He is a winner of the Nicholas Appert Award, also the Industrial Research Institute Award. And an American Chemical Society publication poll named him "One of the ten ablest in the sphere of food-industry chemistry."

His offices have included presidency of IFT and chairmanships of ACS's Chicago Section and the National Research Council's Agricultural Board. Further, he headed the committee that organized the first National Chemical Exposition. He is a vet of the first World War, in which he won the Croix de Guerre.

Another Engineering Achievement in Packaging Automation

Now . . . YOU CAN PACK YOUR PRODUCT *Automatically!*

QUADNUMATIC

4 MACHINES IN 1

1. CASE OPENER 2. ACCUMULATOR 3. PACKER 4. SEALER

The QUADNUMATIC was designed to fill a long felt need for a single unit to open and form cases, automatically accumulate the case load, inject it into the case, glue and seal.

This all steel pneumatically driven machine is a modern custom engineered unit only 16 feet long.

QUADNUMATIC accumulates any desired pattern in any number of tiers and opens and loads top opening or end opening cases.

Some items now being packed by the Quadnumatic . . .

- CANNED MILK
- POWDERED MILK
- HOUSEHOLD FOIL
- HOUSEHOLD WAX PAPER
- PACKAGED PAPER
- CANS OF PAINT
- PACKAGED SUGAR
- SPARK PLUGS
- OIL FILTERS
- TOILET TISSUE
- FLASHLIGHT BATTERIES
- FROZEN FOOD PKGS.
- FLASH BULBS
- LIGHT BULBS
- COILED WIRE
- LARD

Other Engineering Achievements

THE 9 FT. CASEALER . . . CASE OPENERS . . . CASE OPENERS AND BOTTOM GLUERS

SCHROEDER MACHINES CORPORATION

NEW COURT AVE., INDUSTRIAL PARK, EAST SYRACUSE, N. Y. BOX 1123, SYRACUSE, N. Y. PHONE 73-6658

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PICK *Clinton*®

CORN STARCH . . .
. . . CORN SYRUP
. . . REFINED CORN OIL
. . . DEXTROSE

Among food processors using Clinton products, you'll find them all — canner, packer and baker . . . brewer, candy and ice cream maker.

All these food processors have one thing in common: They know that *quality* processing requires *quality* ingredients. For many years, Clinton has had a reputation for producing the very best in dextrose (Clintose), corn starches, corn syrups and refined corn oil for the food industry.

That's why our customer files hold some of the best-known food names in America. If *your* name's not there, it ought to be! Can we get together soon?

and remember • technical service in connection with your specific problems is available upon request.

Quality products
FROM THE WORLD'S CORN CENTER
CLINTON
CLINTON CORN PRODUCTS COMPANY
CLINTON, IOWA
Our 50th Anniversary Year 1907-1957

R. Arnold Jackson has been elected president and board member of Ward Baking Co. August F. Guckenberger is new v.-p. in charge of sales, advertising, and merchandising.

---

for Pepsi-Cola International, New York City.

P. L. (Bud) Murphy, manager of Taystee Bread plant of American Bakeries Co., Louisville, has retired. He is succeeded by Willard Tucker.

John Makepeace, 84, has resigned as secretary-treasurer of National Cranberry Assn. because of "advancing years".

J. J. Porterfield has been appointed general superintendent of refining operations for American Crystal Sugar Co., Denver. He succeeds Frank M. Sabine, resigned.

John A. Roosevelt is new board chairman and president of Universal Food Products Inc. The company, formed in December, is the parent company of Golden Gift, Inc.

Harold P. Requa, Jr., Westgate-California Tuna Packing Co., San Diego, is new president of California Fish Canners Assn.

L. S. Saylor, H. D. Smith, V. V. Baker, and **L. F. Ostermeier,** respectively, have been elected v.-p. and assistant to executive v.-p. and general manager, v.-p. of personnel, v.-p. of transportation, and v.-p. of manufacturing, for Canada Dry Ginger Ale, Inc.

David Schwartz and **C. W. Ofelt** have been named to posts with Central Research Laboratories, DCA Food Industries, Inc. (formerly Doughnut Corp. of America). First named is now manager and director of quality control, and latter is director of bakery products.

Joseph Settineri has been elected to a second term as president of National Prepaired Frozen Food Processors Assn., Miami Beach, Fla.

Samuel Silverman, a pioneer in the prepaired flour mix business has resigned from the presidency of Modern Maid Food Products Inc. He is succeeded by Jack Silverman.

H. E. Woodford, president of Consolidated Food Processors, Inc., has been elected to the board of Consolidated Foods Corp., and also to its executive committee.

Industry

A. E. Staley Mfg. Co., Decatur, Ill., is installing a special conveyor belt that will carry grain a distance of 2,630 ft.

Archer-Daniels-Midland Co., Minneapolis, and Belgian Palmafina Co., Brussels, Belgium, have signed a partnership agreement and joined in the construction of an oleochemical production and research center in Ertvelde Rieme, Belgium. The announcement was made by the Belgian Office of Foreign Trade.

Crane Packing Co., Morton Grove, Ill., announces purchase of a 30,000 sq. ft. plant in Vandalia, Ill.

C. F. Muller Co., Jersey City, N. J., has begun construction on a plant addition to facili-

DODGE *PowerGiants*

Dodge T700
Tandem

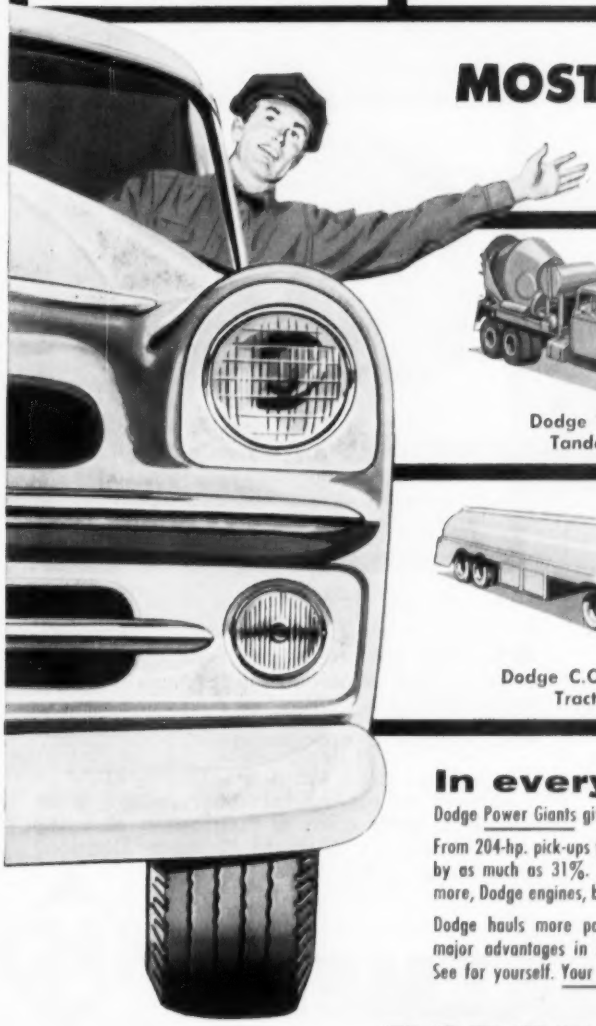
Dodge P300
Forward-Control

Dodge 600
with Van Body

Special bodies fit readily
on any Dodge chassis

Dodge 500
Stake

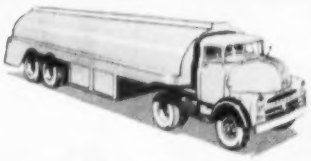
Dodge 400
with Beverage Body



MOST *POWER* OF THE LOW-PRICED 3

Dodge T900
Tandem

Dodge 100
Panel



Dodge C.O.E. 700
Tractor

Dodge 800
Tractor

In every weight class

Dodge Power Giants give you an extra bonus of power.

From 204-hp. pick-ups to 232-hp. tandems, Dodge V-8's outpower the "other two" by as much as 31%. This extra power reduces engine strain, saves wear. What's more, Dodge engines, both V-8's and 6's deliver full power on regular gas.

Dodge hauls more payload, too . . . up to one-third more. And Dodge offers major advantages in driving ease, cab comfort and prestige-building good looks. See for yourself. Your Dodge dealer has a Power Giant to meet every trucking need.

DODGE TRUCKS WITH THE *FORWARD* LOOK

For more data, circle this page number on card at back →

There's MORE Mill Output with Rib-Type MOTORS

Ralston Purina Chows are kept moving with Allis-Chalmers MOTORS

Rib-Type Construction gives Allis-Chalmers motors up to 43% more cooling surface — as compared with standard designs.

The Ralston Purina Company, long noted for its high quality products and modern processing methods, uses a large number of Allis-Chalmers motors in its Harrisburg, Pennsylvania, chow plant.

Throughout the industry, efficiency-minded millers are specifying Allis-Chalmers motors for a variety of uses—indoors and out. The reason:

Continuous Operation!

- Deep-ribbed frame means efficient cooling. Quickly swept clean of accumulated material — no external air passages to clog. It's hard for mill dust to "suffocate" A-C motors.
- Bearings protected from dust by external rotating seal. Provision for easy relubrication while in service.
- Liberal use of copper means top performance.

To find out more about the MORE in Allis-Chalmers motors, contact your nearby Allis-Chalmers sales office or distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

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tate unloading of raw materials from Airslide cars.

C. H. Musselman Co., Biglerville, Pa., is celebrating its 50th anniversary.

General Foods Corp. announces formation of a new company in Brazil, called Industrias Alimenticias Gerais, S. A. This company plans to construct a modern plant in Sao Paulo, Brazil.

Hunt Foods, Inc., Fullerton, Calif., reports completion of plans for addition of 20,000 sq. ft. of space to its general office building.

H. C. Brill Co., Inc., announces that its Bakery Products Div. and Grocery Products Div. will operate as two separate companies.

John Morrell & Co., Chicago, announces purchase of Holly Meat Packing Co., Holly Cold Storage Co., both of Oakland, Calif., and the properties of Bob Ostrow Co., San Francisco.

Pepsi-Cola International has opened bottling installations at Pereira, Columbia; Recife, Brazil; and Brummundall, Norway. It expects to open 29 new plants abroad during the coming year.

Salerno-Megowen Biscuit Co., Chicago, plans to construct a new $2½ million baking plant.

Associated Industries

Atlas Powder Co., Wilmington, Del., has broken ground for a $3 million technical center to extend its long-range basic research and expand its technical service to the food industry.

National Can Corp., Chicago, announces election of Robert Stuart and Wesley H. Douglass as v.-p.s.

American Can Co. has begun construction on its third Texas plant, a $1 million, 115,000 sq. ft. facility at San Antonio.

Bagpak Div., International Paper Co., New York City, has appointed Chester B. McCord as manager of manufacturing.

Beckman Instruments, Inc., and **Statham Laboratories, Inc.,** both of Los Angeles, jointly announce agreement to merge. Beckman Instruments also reports plans to build a $1½ million research center.

Fred C. Heinz, v.-p. in charge of industrial relations for H. J. Heinz Co., has been appointed by President Eisenhower to the newly-created water pollution control advisory board of the Public Health Service.

Borg-Warner Corp., Chicago, reports appointment of J. F. Weiffenbach as director of research and engineering.

Cherry-Burrell Corp., Chicago, has elected Norman W. Nelson and Howard Hall to its board.

Crown Zellerbach Corp., San Francisco, has elevated George S. Runyan to v.-p. for general paper sales, and David J. Benjamin to v.-p. in charge of Western Waxide Specialty Packaging Div.

Deaths

Harry Burnett, 64, former executive of Deerfoot Farms, Southboro, Mass.

Antonio Gioia, 75, president of Gioia Macaroni Co., Inc., Buffalo, N. Y.

Edward G. English, 58, secretary of Central Aguirre Sugar Co., Puerto Rico.

Peter Gustav Schmidt, 76, board chairman of Olympia Brewing Co., Olympia, Wash.

Otto Stahl, 85, founder and honorary chairman of the executive committee of Stahl-Meyer, Inc.

Could this bite lead to a lawsuit?

Manufacturers of food products are sometimes the target for costly and embarrassing claims. Many can be avoided by use of an RCA Metal Detector. It's also important in defending claims to be able to cite the use of the best available preventive procedures. The RCA Metal Detector, with positive, automatic operation, helps safeguard quality, and protects your reputation. In many cases, the savings realized have quickly paid for the installation. Why not get the whole story?

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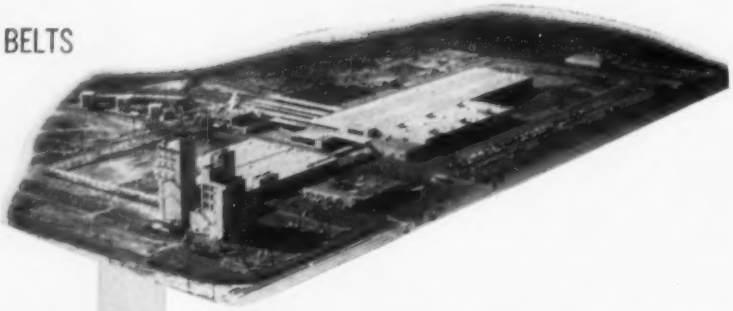
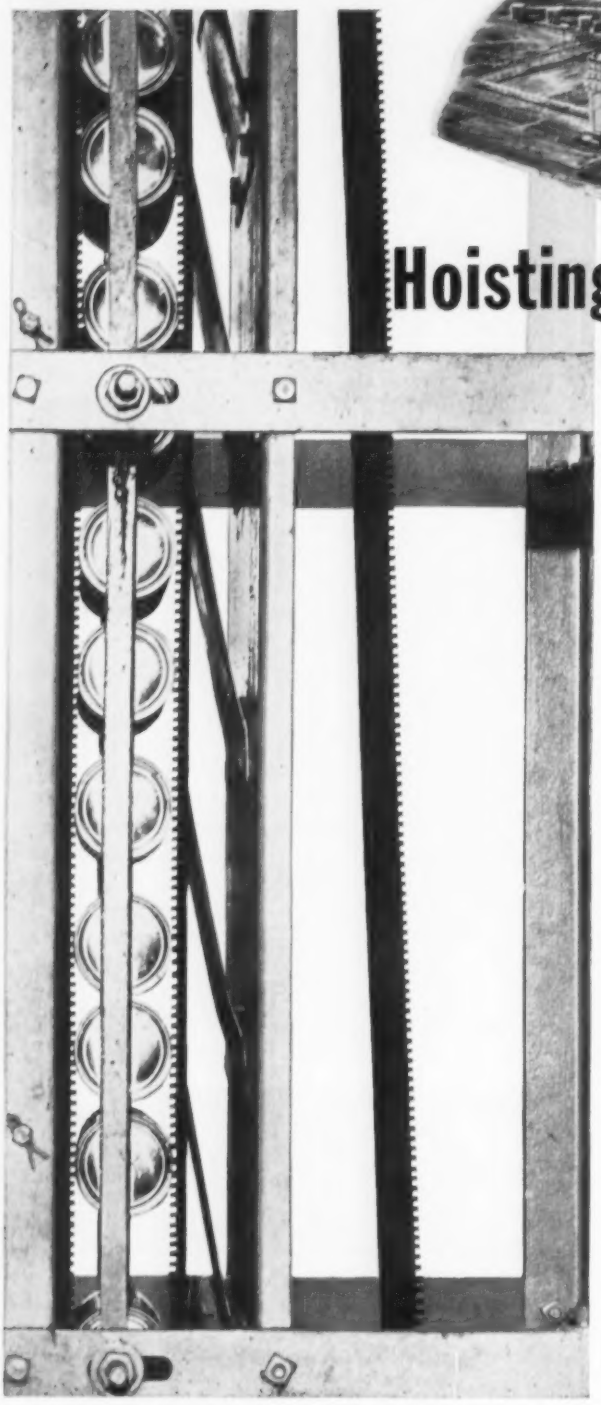
STEEPGRADE CONVEYOR BELTS





Hoisting Millions of Beers–

straight up – with never a slip

At this giant Anheuser-Busch brewery, this pair of U. S. SteepGrade Conveyor Belts lifts 16 oz. cans of beer *at a 90-degree angle.*

"No other belt could have accomplished better performance. It's nothing short of spectacular," says the manager of the brewery.

As the 1-lb. cans come from the pasteurizer slippery and wet, they roll onto the vertical can conveyor where SteepGrade carries them straight up and onto an incline to the carton-filling machine. Cans don't slip at all, even when the conveyor is stopped.

The secret is SteepGrade's exclusive "gripper cleat" construction—a molded, integral part of the belt itself. These thousands of "gripper cleats" hold the cans firmly, yet gently. This means far less pressure, far less belt speed is required. Damage to cans and print smearing is eliminated. And the more efficient operation saves electric power, lengthens belt life.

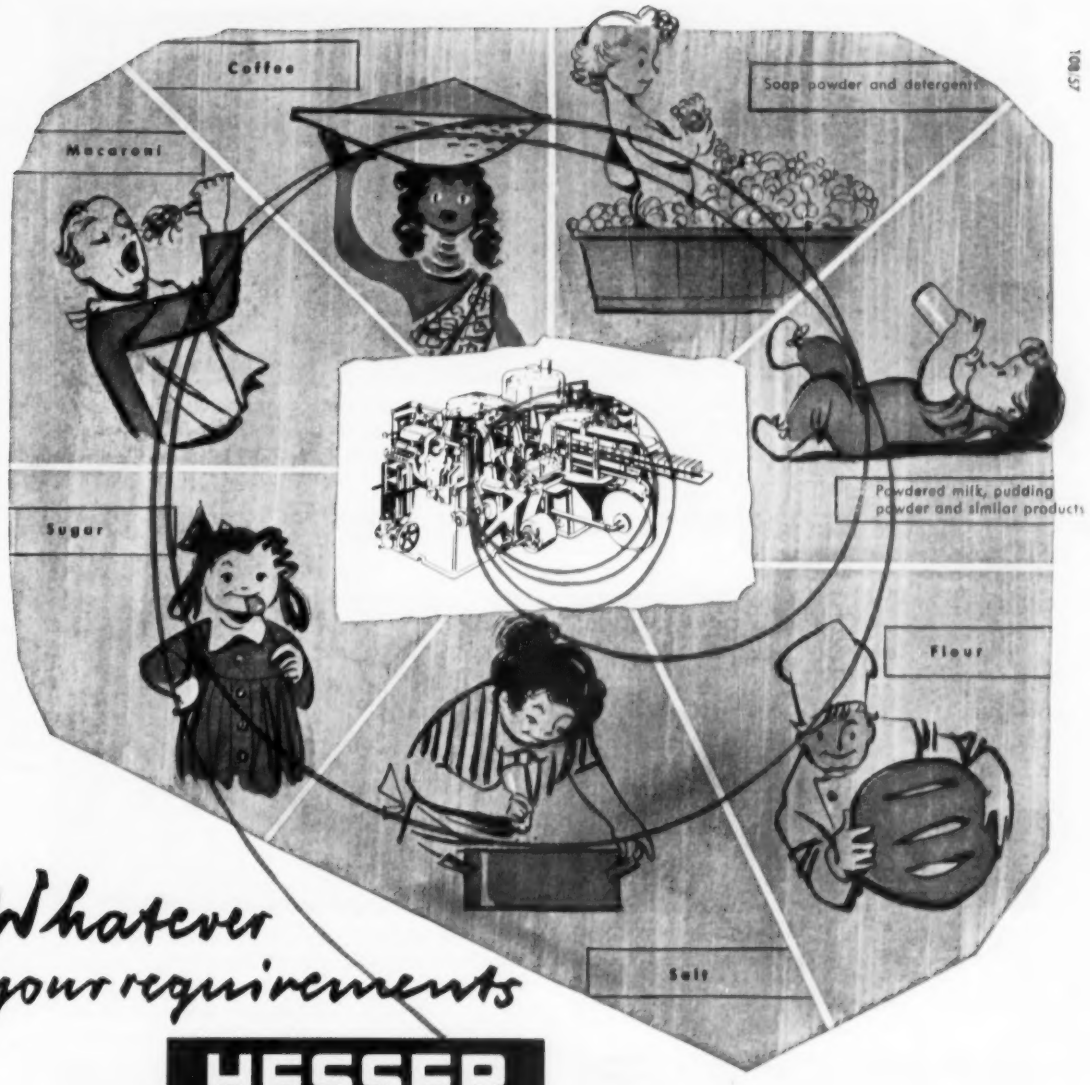
This remarkable materials-handling solution came as a result of U. S. Rubber's Three-Way Engineering service: "U.S." belt engineers worked closely with the designer of the conveyor system and the plant engineer.

This service—plus a complete line of conveyor belting for any materials-handling problem—is obtainable at the 28 "U. S." District Sales Offices, or contact us at Rockefeller Center, New York 20, N. Y. In Canada, Dominion Rubber Co., Ltd.

Close-up of one of the vertical can conveyors. Note how evenly spaced the cans are, how slight is the pressure being exerted against the cans by the belts. This, despite the fact that when the picture was taken, *the belt had been stopped for more than a minute.*

Mechanical Goods Division

United States Rubber



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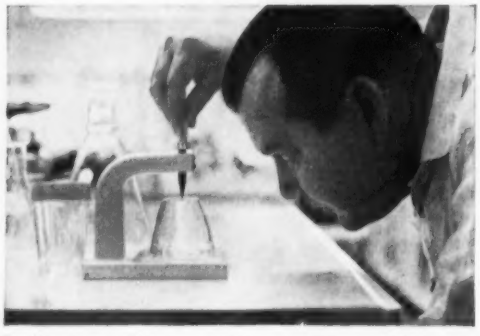
One look at the huge, sprawling buildings at one of the Exchange Products plants and you know that big things are happening inside. For here *citrus* is king. Trucks pour in with fresh fruit from groves all over California and Arizona. Conveyer belts hum along in every direction. And Exchange products are shipped to nearly every part of the world.

Why 'Exchange' products serve you better

Utmost cleanliness is the watchword at Exchange Products plants. Everything has that "just washed-down" look. Every four hours, extraction equipment is completely cleaned. Every third day, the entire plant closes down for a thorough washing.



Exchange quality is assured by constant checking in extensive testing laboratories. In fact, rigid quality controls have been set up *throughout* the plant to make sure that every product measures up to Exchange quality. Sunkist produces more than 400 different citrus products.

The world's largest citrus research department is maintained by the Sunkist Growers to develop new growing methods, to improve manufacturing processes, and to perfect better products. Today, with a backlog of more than 60 years experience, Sunkist has accounted for 118 separate U.S. patents.

Just three of many Exchange products are *Exchange Preserver's Pectin*—guarantees a more uniform finished product; *Exchange Low Methoxyl Pectin*—jells *without* sugar, tasteless, controls "weeping" in pies; *Exchange Lemon Juice*—brings out natural flavor of *any* food. Superior acidulant, excellent anti-oxidant.

Sunkist Growers

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Distributors for

Exchange Lemon Products Co., Corona, Calif. • Exchange Orange Products Co., Ontario, Calif.

ADVANCES IN TECHNOLOGY

Survey Fails to Substantiate Fat-Atherosclerosis Theory

Published data on the relation of essential fatty acids to cholesterol metabolism, have failed to substantiate the frequently made statement that "the western world is poisoning itself with an excessive intake of fat, particularly the hydrogenated variety, and through consumption of processed foods."

This is based on a review of reports on Dietary Fats and Atherosclerosis, most of which were published during the years 1952-56.

Among the points considered are:

1. That there may not have been a noteworthy decrease in essential fatty acid intake in the US during the last 50 yr.

2. That some other dietary factor (or factors) has been, at least partly, responsible for the pandemic of coronary artery disease in northern Europe and North America.

3. That reduction in per capita caloric expenditure during the last 50 yr. may be involved.

4. That experimental animals thrive on diets containing large quantities of hydrogenated fat.—*Nutrition Reviews*, 1-6, Jan. 1957.

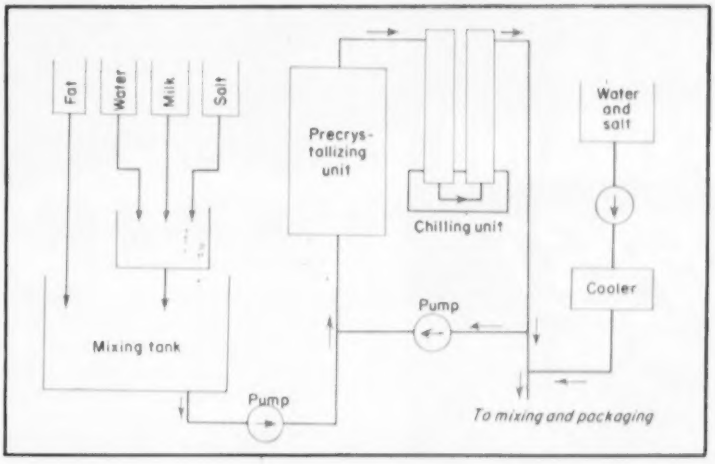
Effect of Gamma Irradiation On Properties of Meats

To minimized development of objectionable off-flavors in meats when irradiated with gamma rays, the treatment should be carried out in a vacuum or atmosphere of N_2.

Even then, the flavor is significantly different from that of unirradiated meats. And when irradiation is applied in air, doses of 0.3 megarep or higher produce rancidity and adverse changes in color.

In a vacuum or N_2 atmosphere, however, increases in peroxides and carbonyls are insignificant. Destruction of hematin pigments is an approximate function of radiation dose. At doses of 0.3-3 megarep, riboflavin, niacin, and vitamin E are relatively stable, but thiamine is unstable—in case of beef its retention was 38% at 1 megarep.

Texture changes, as indicated by expressed drip, are small. At the sterilizing dose, succinoxidase system is still active.—*Food Research*, 555-63, Sept.-Oct. 1956.



New Margarine Manufacturing Process Gives Product Butter-Like Properties

Developing texture, spreadability, general appearance, and flavor that closely proximates that of butter is the object of a recently patented process for the manufacture of margarine.

Crux of the method is precrystallization of the higher melting glycerides in the fat portion at relatively high temperatures, and withholding part of the salt and water until the fat-milk emulsion has been supercooled to approximately 40F.

Precrystallization is effected by mixing a part of the supercooled product with the emulsified fat-milk mixture to attain a temperature of 73-93F., depending on mp. of fat.

Supercooling is done in a Votator type unit where emulsion is subjected to rapid chilling and agitation. Leaving here, a portion is bled off for recirculation. Into remainder, on its way to printing, is injected balance of salt and water at temperature of 20-30F.

Resulting product is said to contain globules of free water, and have a granular appearance similar to butter.

The product's capillary slip melting point is about 32.5C., as compared with 33.6C. for a product of the same composition in which all products were mixed initially.–U.S. Patent 2,772,976, Dec. 4, 1956.

Imparting Butter-Flavor To Fatty Food Products

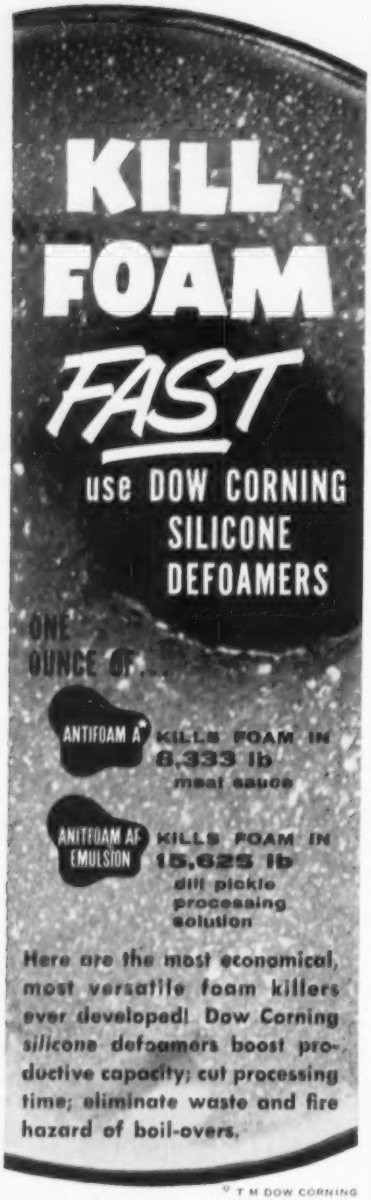
In a recently patented process the inventor reveals that a relatively stable butter-like flavor may be imparted to fat-containing food products by the addition of a small amount of certain butyl alcohols, with or without minute amounts of diacetyl.

Advantages claimed for the new process are that the flavor does not show a tendency to fade after several weeks, nor does it at any time resemble that of a rancid fat.

The preferred alcohols are butyl and isobutyl. If diacetyl also is used, the quantity may be reduced to a level considerably below that normally employed. The alcohols are added to fat component prior to mixing them with the other ingredients.

In the case of oleomargarine, for example, the fat is liquefied before adding alcohols and allowed to solidify after mixing.

On account of the minute amounts of flavoring material used, it is desirable to have a carrier such as propylene glycol or glycerine. A suitable formula would contain 500g. butanol, 20g. diacetyl, and



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530g. glycerol—120 ml. of this mixture would be sufficient to impart a butter-like flavor to 3000 lb. of margarine.

Modifications in flavor to suit individual taste may be obtained with traces of butyl butyrate, butyl acetate, ethyl butyrate and similar compounds, but butyl alcohol is required to impart a mild and stable flavor and to mask undesirable taste and odor.—U.S. Patent 2,773,772, Dec. 11, 1956.

Shortening and Additives Mixed Continuously

Modifying a standard shortening base by injecting additives such as emulsifiers and antioxidants in any desired proportion, thus enabling a baker or culinary mix manufacturer to greatly reduce his inventory, is the object of a recently patented process.

Basic equipment required comprises primary pump for shortening that develops 300-400 psi. pressure, pumps for additives with means for controlling their outputs, metering means between first pump and pont of entry of additives, relief valve for suddenly reducing pressure of mixture and providing intimate mixing.

For best results, base shortening should pass through a heat exchanger where it is supercooled and agitated to incorporate air or other gas, before entering above described system.—U.S. Patent 2,770,544, Nov. 13, 1956.

Kent-Jones Reflectometer

Flour brightness may be estimated with improved accuracy by means of the Series II Kent-Jones and Martin color grader.

In this instrument two beams of light from the same lamp impinge on two photocells. One beam reaches its cell directly except for an adjustable shutter used to balance the galvanometer zero of the instrument.

Second beam is reflected from a cell containing flour sample (paste of 30g. flour plus 50 ml. H_2O), through an adjustable shutter connected to a color scale by a cam, to its measuring photocell. When photocells are balanced by adjustment of measuring scale shutter, brightness of flour in Kent-Jones and Martin units is read directly from the scale.

In bottom half of sample cell is a working reference standard of reflectance for balancing the instrument before making brightness estimations. Also supplied is a separate ultimate reference standard for resetting scale when a lamp has to be changed or a broken sample cell replaced. Standards are made of polished Vitrolite.

Replicate brightness estimations should give the same grade value within 0.1 units, about ¼ of visual distinction limit. Replicates on samples of grade 0.5-3.0 by different laboratories may be expected to agree within 0.35 units.

Use of the instrument showed that Cl_2O_6 alone, or with benzoyl peroxide, as bleaching agents do not affect grade of a flour appreciably, but full bleaching by benzoyl peroxide alone lowered the figure by 0.2-0.3 units.—*Chemistry-Industry*, 1490-93, 1956.

Oxidation of Humulone Cuts Hops Bitterness

Beer bitterness is due to the conversion of the humulone of hops to the isohumulones found in beer.

For adequate control of hopping, therefore, the humulone or alpha-bitter acid content of hops should be known. During storage, however, the alpha-bitter acid deteriorates at rates that vary with different varieties of hops.

Acceleration of deterioration by the myrcene component of hop oil has been reported and a high degree of correlation between myrcene content and alpha-bitter acid was found for the 1952 crop (9 samples), as well as in 1954 hops (20 samples).

In 1953 hops, however, there was little correlation between deterioration of hops and myrcene content in the 20 samples tested.

Other factors affecting alpha-bitter acid deterioration during storage seem to be present. Lupulone (beta-bitter acid) has also been held responsible for humulone oxidation, but this could not be demonstrated in the 1953 and 1954 samples studied.—*International Tijdschrift voor Brouwerij en Mouterij*, 16, 2, 41-59, 1956. (In Dutch.)

Antibiotic Controls Bacteria Infecting Brewers' Yeast

Polymyxin B was tested for its ability to eliminate 3 types of bacteria frequently associated with brewers' yeast.

These are the common Gram-negative yeast rod, probably *Flavobacterium proteus*, Gram-positive long rod, probably a *Lactobacillus*, and a Gram-negative, acid-forming,

"CLICK" lubrication starts when your machines start!

ALEMITE OIL-MIST AUTOMATIC LUBRICATION

provides constant, uniform, foolproof lubrication— at savings up to 90%!

Alemite Oil-Mist *atomizes* oil into tiny, airborne particles that are distributed to bearings through tubing. It bathes all bearings with a cool film of clean oil . . . maintains uniform oil film regardless of variations in loads, temperature and speed. Simple, continuous, fully automatic. Eliminates the waste and uncertainties of the "human element" in lubrication. Uses up to *90% less lubricant* than ordinary lubrication methods!

Lubricates any bearing on any machine with one of three types of fittings:

Mist fittings for roller, ball, needle—or any anti-friction type of bearings.

Spray fittings for open and enclosed gears and chains.

Condensing fittings for plain bearings, slides, ways, vees, cams, and rollers.

8 Advantages of the Alemite Oil-Mist System

1. Continuous lubrication. Deposits fresh, clean film of oil on all surfaces of all bearings.

2. Fully automatic. Starts and stops with operation of machine switch.

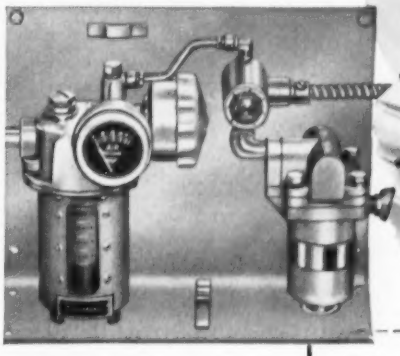
3. No guesswork. Bearings can't be overlooked, or over-lubricated!

4. Reduction of bearing temperatures. Acts as bearing coolant. Reduces bearing temperatures as much as 20°F.

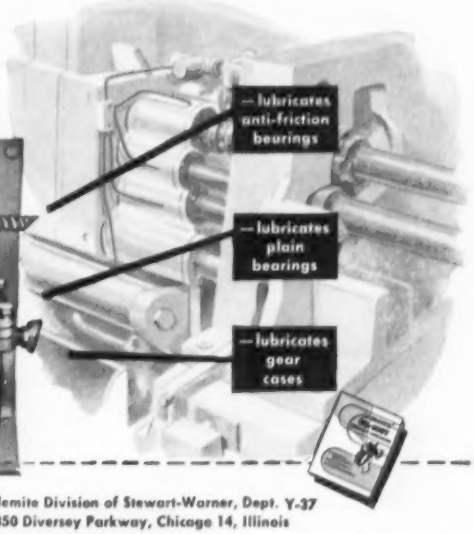
5. Fewer types of oil. Reduces number of oils that must be stocked, handled and applied.

6. Elimination of downtime. All bearings are constantly lubricated while machines continue to operate.

7. Extension of bearing life. Life of grinding machine bearings have been extended from 400 to 7,000 hours!



8. As high as 90% less oil consumption. Usually consumes about 1/10th amount used by any other oiling method.



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Many food processors insist on a chlorine solution for sanitizing. Others are just as sold on the quaternary ammonium type, and quite a few like to use both kinds. With Oakite sanitizing you can take your choice. Either way, you get instant bacteria destruction at lowest cost, with safety and convenience.

OAKITE BACTERICIDE (chlorine type, powder) gives you immediate bacteria-kill plus all these additional advantages. Only 100 parts-per-million in water makes an effective solution, insuring the utmost in economy. It is instantly soluble in cold or warm water, makes a clear solution that drains free and leaves no residue, is safe on all surfaces. Has anti-mold and deodorizing properties. Can be used as a dip, rinse or spray.

OAKITE SANITIZER #1 (quaternary ammonium type, liquid) is designed for sanitizing after cleaning and rinsing are completed. Not only does it promptly destroy bacteria, but it leaves a residual film on equipment, sustaining germicidal activity until it is rinsed off. Mixes instantly with hot or cold water, is stable, noncorrosive, safe on all surfaces. Just a thimbleful of this powerful sanitizer makes a gallon of bug-killing solution.

Talk over your sanitizing operations with your local Oakite Technical Service Representative. He can be a big help. While you're at it, ask him about the Oakite Hozon Unit—the simple gadget that's small enough to fit in the palm of your hand, yet does a man-size job of "mechanized" sanitizing. Like your Oakite man's help, the Hozon Unit costs you nothing.

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short rod, similar in appearance to the common yeast rod but differing from it in physiological properties.

Within the ranges of infection by these bacteria that were tested, all can be removed from yeast and beer by treatment with polymyxin B. The antibiotic may be added: (1) to wort at start of fermentation (1 ppm.); (2) to pitching yeast 15 min. before use (73.5 ppm., equivalent to 0.25 ppm. in the pitched wort), or (3) used to treat the yeast separately (150 ppm. for 30 min.) followed washing away the excess. There seems to be no adverse effect on yeast even with concentrations as high as 500 ppm.—*Journ., Institute of Brewing*, 62, 6, 477-85, 1956.

Food-Poisoning Bacteria Inhibited by Antibiotic

Transient preservation of fish with Aureomycin (CTC), either by incorporating it in ice or in refrigerated sea water, inhibits food-poisoning bacteria as well as the usual fish-spoilage bacteria.

This was determined by experiments in which minced fish fillets were inoculated with a food-poisoning strain of *Staphylococcus aureas* and with vegetative cells of *Cl. botulinum* and stored at 50F. In each case 4 samples were prepared—2 inoculated, and 2 untreated. Then to one of each pair 2 ppm. CTC were added.

In case of *St. aureas*, direct bacteriological counts after 5 days showed that the antibiotic had strongly retarded development of both the food poisoning and natural spoilage bacteria.

With *Cl. botulinum*, number of living cells at end of 3 days had decreased about 40% in the treated flesh, while in the untreated sample there was no significant change.—*Pacific Progress Reports No.* 106, *Fisheries Research Board of Canada*, 8-10, Sept. 1956.

Bacterial Flora Vary In Low Salt Brines

Pickle brines may have quite different flora under the same conditions. In four 45-gal. barrel fermentations of large cucumbers (spontaneous fermentation) both the dominant species, and the relative numbers and effects of the species were quite different.

Leuconostoc mesenteroides, Pediococcus cerevisiae, Lactobacillus brevis and *plantarum* were found most often in the 949 cultures iso-

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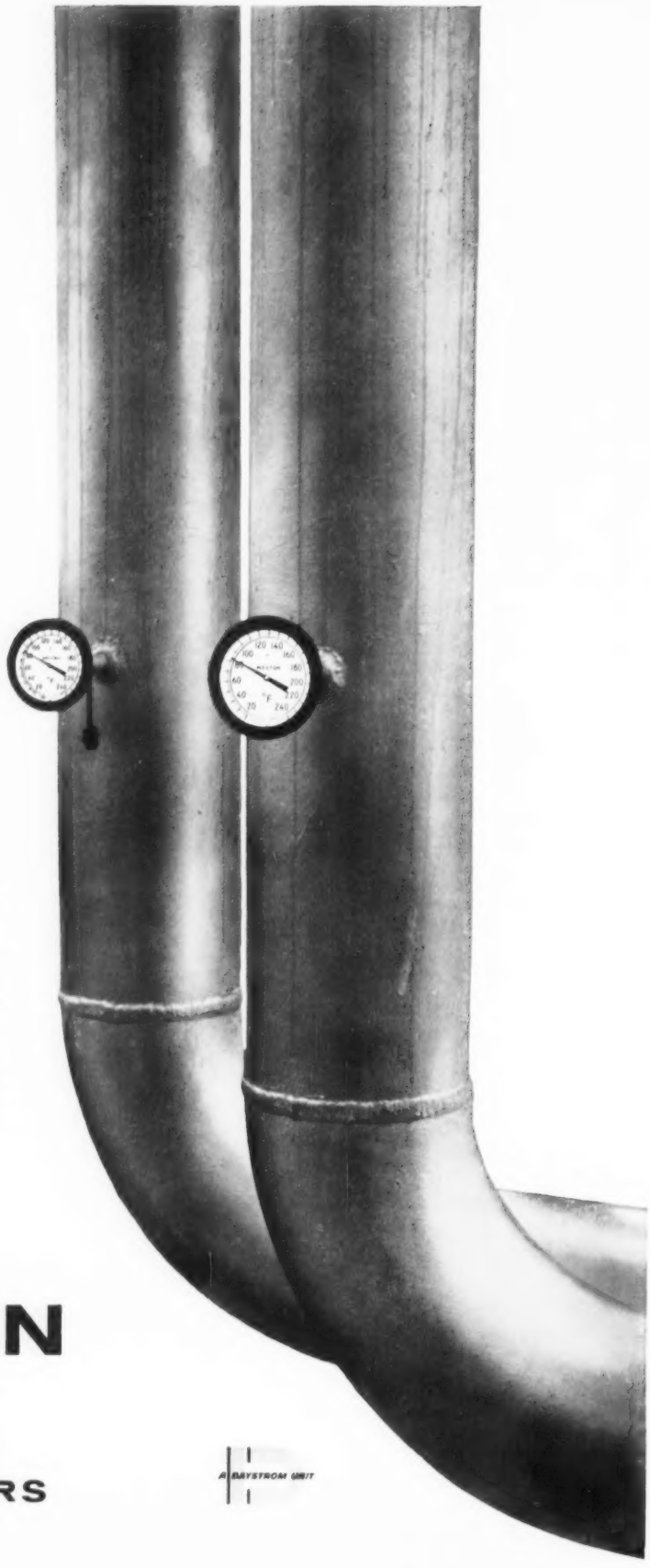

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A brand-new, board-form insulation for cold rooms operating at temperatures as low as minus 50° F. has been developed recently by Armstrong. Called Armalite*, it's a white closed cellular material with an extremely low K-factor of 0.24 Btu-in./sq.ft.-hr.-°F. at 70° mean temperature. Armalite has a resilience or "springiness" that allows tight joint construction, and its dimensional stability in service is excellent. Light weight of only 1.25 lbs. per cubic foot means easy handling. High strength keeps edges and corners sharp and accurate. Boards are 12" x 36," in 2", 3", and 4" thicknesses.

Armalite is one of the many quality products in the full line of Armstrong Industrial Insulations. Armstrong also offers you a complete contracting service geared to install these materials economically and efficiently.

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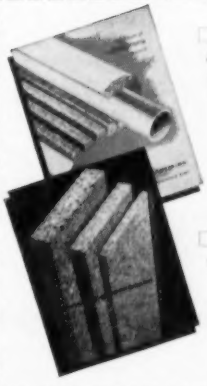

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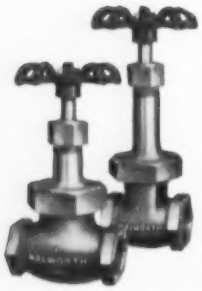
TYPICAL OF WALWORTH QUALITY is the union body-to-bonnet connection which stiffens the body against internal pressure; makes taking the valve apart a simple operation and reduces the chances of distortion or leakage even though the valve is repeatedly taken apart and reassembled. With this type of construction there is no possibility of the bonnet coming off the valve while the handwheel is being turned.

HEAVY BODY CONSTRUCTION is typical of *all* Walworth Bronze Valves. Extra-thick walls and rugged wrench hexes constitute a high safety factor and prevent distortion while the valve is being installed in the pipeline. Extra-deep pipe threads are accurately machined to eliminate leakage. Walworth Bronze Valves are also available with flanged, silver-brazed or soldered ends in certain sizes and types.

EXTRA-LARGE STEMS with extra-long, extra-deep threads prolong valve life, protect against wear and distortion and provide tight positive shutoff. The surface of the stem is machined to a glass-like finish for minimum handwheel effort and to preserve the packing which results in fewer inspections and less maintenance. The top of the stem is tapered and squared to hold the handwheel securely.

TO REDUCE WIRE DRAWING to a minimum, certain types of bronze globe valves have stainless-steel plug-type seats and discs heat-treated to a nominal hardness of 500 Brinell, adding years to valve life even in severe services. These valves can be tightly closed on sand, grit or pipe scale without damage. Seats and discs are machined simultaneously, assuring perfect mating.

There is a Walworth Bronze Gate, Globe, Angle or Check Valve for every service. Walworth is continually developing new valve types and materials, including plastics, to keep pace with the growing variety and severity of services in modern industry. For full information, see your Walworth Distributor or write: *Walworth, 60 East 42nd Street, New York 17, N.Y.*



WALWORTH

Bronze Valves and Fittings

lated. In one fermentation *cerevisiae* was dominant; in another it was completely absent.

Fermentations inoculated with pure cultures of the homo-fermentative *plantarum* developed lower volatile acidity and lower pH than did similar fermentations inoculated with the heterofermentative *brevis*. Volatile acidity and pH in relation to total acidity may be used as a criterion of the activity of the two types of bacteria. The value of pure culture inoculation, and the encouragement of dominance of the fermentation by one type of organism is still questionable.—*Applied Microbiology* 4(5), 259-63, 1956.

Concentrating Fruit Juice

In a recently patented process relating to concentration of fruit juices by multiple-effect evaporation, the inventor recovers volatile flavoring substances from the vaporized water by adsorption on activated carbon. These are subsequently stripped from the carbon and added to the concentrate, thus restoring to the product its original flavor.

Apparatus for carrying out the invention consists of a pair of adsorption chambers for each evaporator. In a 3-effect system, for example, vapors from the first effect would pass alternately through its adsorption chambers so that one might be stripped while the other is in use. The same provision is made for the 2nd- and 3rd-effect evaporators, making the process continuous.

Stripping is accomplished by low-pressure steam, then mixture of steam and flavoring material is condensed. All or any desired part of the flavor concentrate may be added to the concentrated juice. Essential oils that may be in the juice are also stripped from the adsorbent and condensed. But being insoluble in water they separate as an upper layer in the condensate and may be withdrawn.–U.S. Patent 2,773,774, Dec. 11, 1956.

Amber Bottles Are Effective In Protecting Milk Flavor

As a method of retarding off-flavor development in milk exposed to sunlight, amber glass bottles are superior to either waxed paper containers or clear glass bottles.

This fact, originally suggested by experiments in the U.S., has been confirmed by Australian researchers. They found that milk in amber glass could be exposed about 3 times as long as in clear bottles for the same intensity of off flavors.

However, the colored bottles caused the milk to heat more than other containers which lessens its keeping quality. Waxed paper, although somewhat less effective than amber glass in protecting flavor, showed the best insulating properties.—*Australian J. Dairy Technology*, 69-70, Apr.-June, 1956.

Preformed Ground-Meat

A meat product having the consistency of steak may be formed from ground beef, according to the specifications of a recently granted patent.

Lean beef and connecting tissues are ground, chilled, and held for 8-hr., during which time connecting tissues turn gelatinous. Product is again ground and extruded through a die that forms a cohesive mass of any desired shape and thickness. Longitudinal ridges or serrations are formed on the top of the mass to enable better heat transmission during cooking.

For convenience in handling, the preformed product is carried from the machine on a continuous strip of paper running under the shaper. Paper and meat product may be cut into any desired size for marketing.–U.S. Patent 2,771,366, Nov. 20, 1956.

Carbonating Coffee Extract Improves the "Instant"

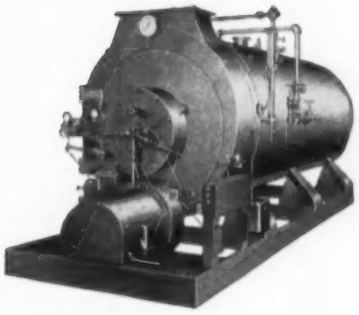
Improvement in the properties of so-called "instant coffee" is claimed for a patented process in which the coffee extract is carbonated before spray-drying.

Improved product is spherical in shape, free-flowing, readily soluble, and has a high apparent specific volume. Furthermore, the retained CO_2 seems to have a beneficial effect on the keeping quality and flavor of the product.

Coffee is extracted by passing hot water through a series of percolators containing, in the direction of flow, progressively less extracted ground coffee.

In such a system, water enters the train at 255-300F., passing first through the most completely extracted coffee and, with decending temperature gradient, leaves the system at 60-80F., after passing through the least extracted coffee. This liquor is heated to about 123F. and sprayed (60 psig.) into a chamber charged with CO_2.

From the carbonator the liquid is pumped to a conventional spray drier at a feed pressure of 800-1000 psig. Air inlet and outlet tempera-



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tures are 500 and 230F., respectively. Air flow is 7,000 cfm. for a feed of 2-gal. per min. with 50% soluble solids. Capacity of spray-drying unit is claimed to be increased about 10% by use of improved process.—U.S. Patent 2,771,364, Nov. 20, 1956.

Ca, Mg Deposits Prevented By Reducing pH of Water

Acidification as a method of controlling calcium deposits in hot water used for sanitizing dairy equipment results in a saving of time and money, as well as providing better control of thermoduric organisms.

This was confirmed by tests in which a naturally hard water of 30 gr. hardness per gal. (342 ppm.), and dilutions of it to 5, 10 and 15 gr., were adjusted to pH 6, 5, 4, and 3 with hydrochloric, phosphoric, acetic, hydroxyacetic, gluconic, and levulinic acids.

When these waters were heated to 165F., gluconic and levulinic acids were most effective in keeping Ca in solution. There was no added advantage in reducing the pH below 5, although at pH 4 the acids used are not measurably corrosive to type 302 18-8 stainless steel.

There was some evidence of corrosion with HCl at pH 3 after 24-48 hr. Less resistant metals were not studied.—*J. Milk & Food Technology*, 19(8), 213-16, 1956.

Imitation Nutmeats

Making imitation nutmeats from proteinaceous fibers is the subject of a recently patented process.

The fibers can be formed from casein or soybean protein by extruding an aqueous colloidal solution of the material through a fine orifice into a bath of acid-salt solution. Here the material is precipitated in the form of fine threads.

The fibers are first cut into comparatively small pieces and subjected to a fusing action, creating a mass that subsequently can be reduced to relatively small particles. These are subjected to a dehydrating and plasticizing treatment with glycerine, after which flavoring is added, completing the process.

In the course of the operation the pH of the fibers is adjusted to yield a product of texture similar to nutmeats. This varies with the source of the proteinaceous material. If desired, appropriate quantities of fat may be added to the original colloidal solution prior to extrusion.—U.S. Patent 2,776,212, Jan. 1, 1957.

GARLOCK *and* UNITED STATES GASKET

integrate their sales forces

United States Gasket Company—pioneers and leaders in the fabrication and application of TEFLON*, KEL-F†, Nylon and other Engineered Plastics—now will be known as *United States Gasket Company, Plastics Division* of *The Garlock Packing Company.*

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EVEN GREATER KNOW-HOW . . . To United States Gasket's unique knowledge of the Engineered Plastics for electrical, chemical, and mechanical services, throughout Industry, Garlock now adds its 70 years of experience and research in solving the sealing problems of Industry with packings, gaskets and closures for every conceivable need.

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*duPont trademark †Kellogg trademark

United States Gasket *Plastics Division*

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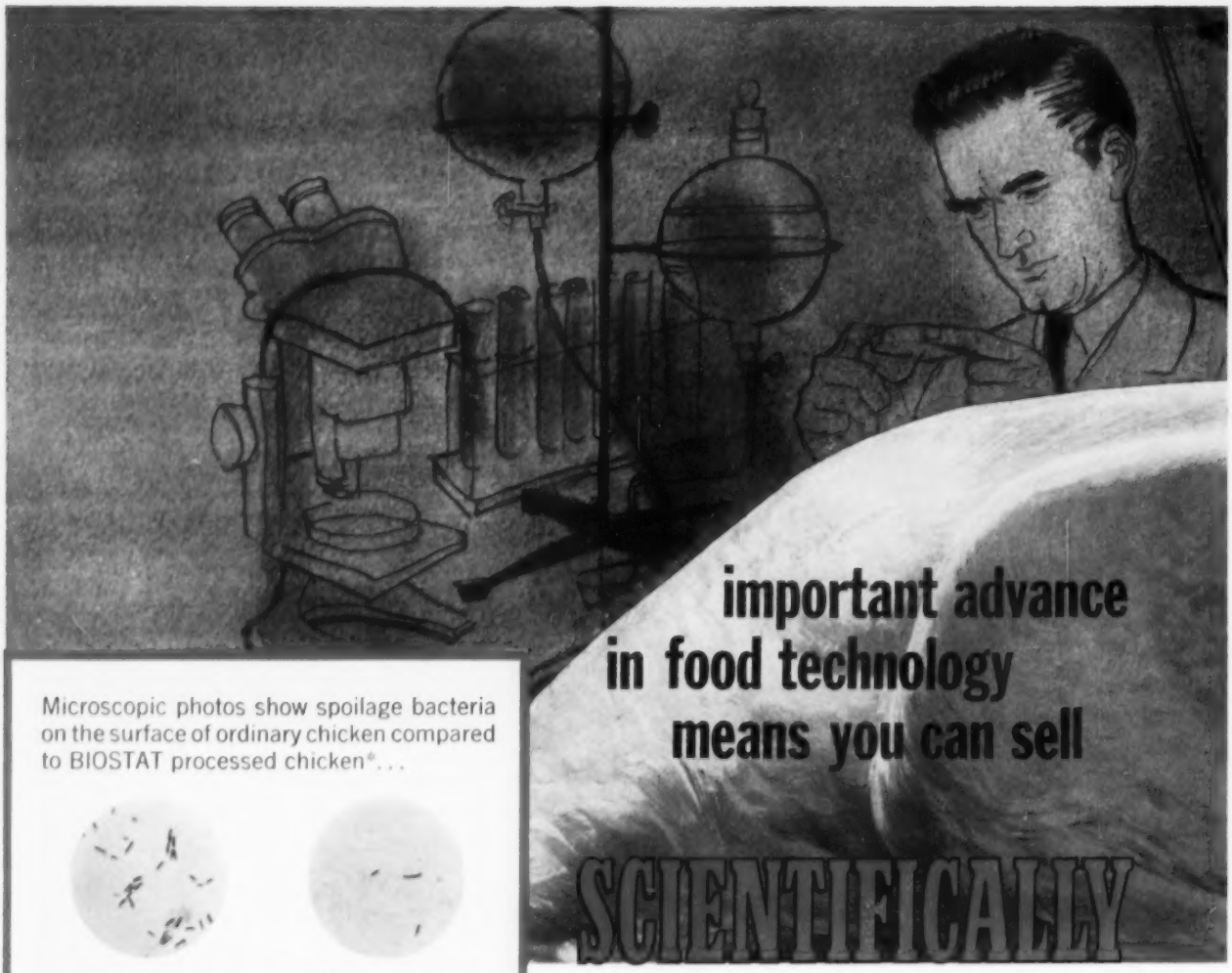
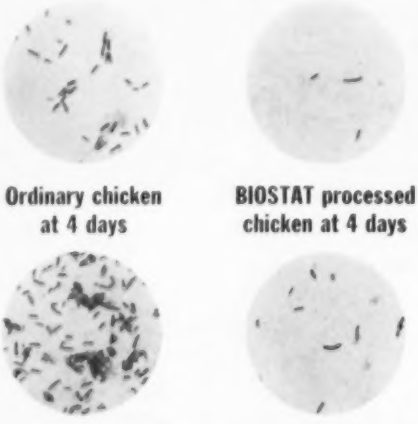


important advance in food technology means you can sell SCIENTIFICALLY

Microscopic photos show spoilage bacteria on the surface of ordinary chicken compared to BIOSTAT processed chicken*...



Ordinary chicken at 4 days | **BIOSTAT processed chicken at 4 days**

Ordinary chicken at 7 days | **BIOSTAT processed chicken at 7 days**

*The birds were ice chilled and processed under the same high standards of sanitation. (BIOSTAT should be used in connection with good sanitation and refrigeration.)

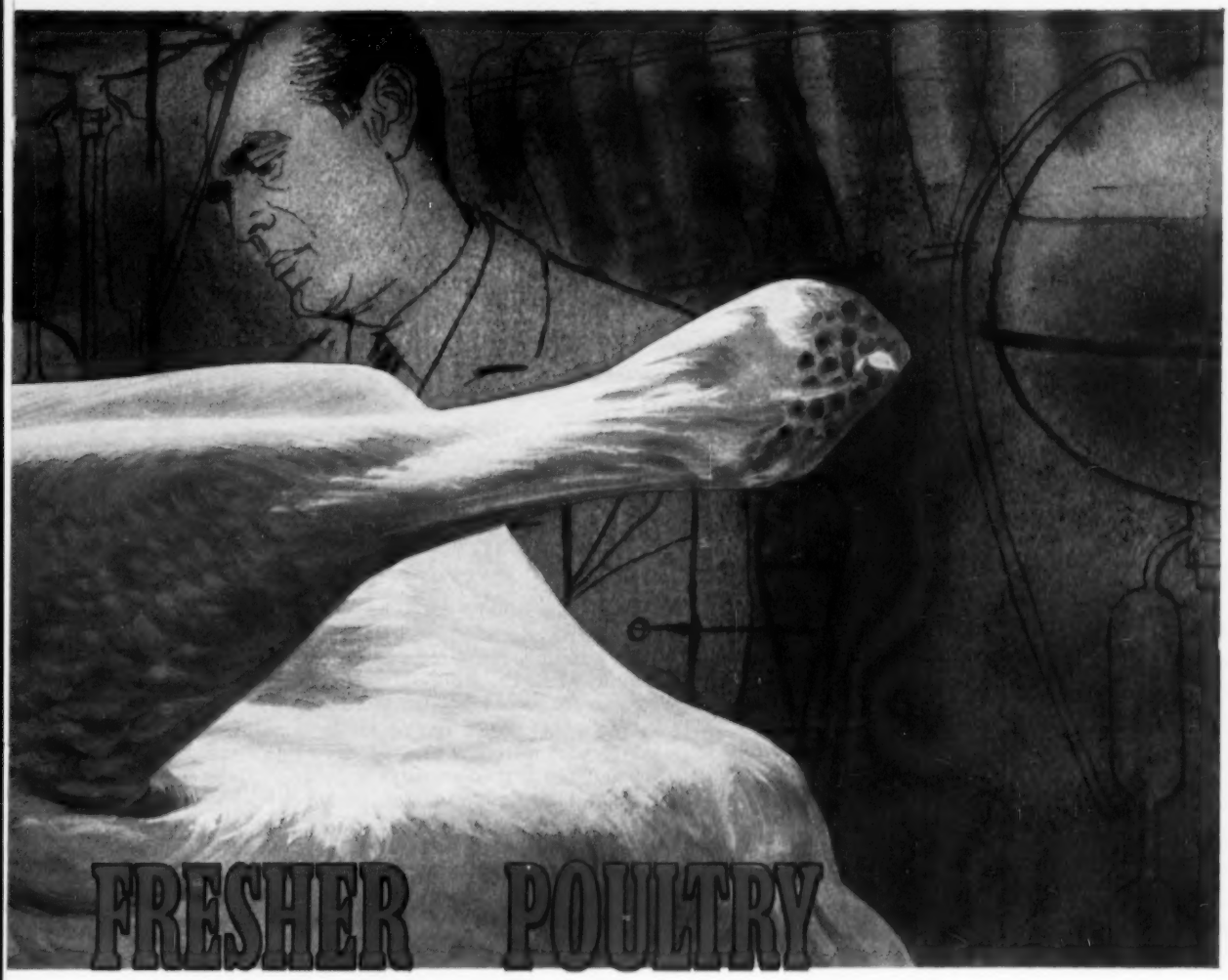
● You know better than anyone that the store traffic and the sales volume of your retail customers depend in no small measure on the quality of their fresh meat and poultry. Yet maintaining a balance between inventory and fresh quality is a continuing problem for retail managers.

Today, however, retail managements all over the country are discovering how they can help solve this problem . . . how they can sell **SCIENTIFICALLY FRESHER POULTRY** by ordering birds **BIOSTAT®** processed.

Whether your retail customer sells a chicken 2 days, 5 days, 7 days after you process it, it will in each case be a fresher chicken. A chicken with lower bacterial count. The illustrations at left show the difference in scientific freshness between chickens processed with and without BIOSTAT, under the same high standards of sanitation. BIOSTAT provides no substitute for high standards of sanitation or for refrigeration. But it does provide the retailer with *the utmost confidence in the freshness of his product—which is your best sales insurance and the best means of increasing consumer demand for your products.*

It is important that retailers become aware of the sales

Deliver your poultry



advantages of BIOSTAT processed poultry. To develop this awareness, Pfizer is running ads similar to this one in the trade magazines which grocery chain buyers read.

FACTS ABOUT BIOSTAT

BIOSTAT is produced only by Chas. Pfizer & Co., Inc., world's largest producer of antibiotics. It has been accepted by the FDA for use on poultry to retard bacterial spoilage. Its effectiveness has been proved by thousands of tests. The active ingredient of Pfizer BIOSTAT-PA (poultry application) is the antibiotic oxytetracycline.

PFIZER POLICY

Pfizer offers you a *free sample* of BIOSTAT (50 grams) and technical help in starting antibiotic treatment. **No promotional labeling of BIOSTAT is required. As in the past, Pfizer leaves control of end product merchandising to processors.**

Write to Pfizer today for your free sample of BIOSTAT and full details on how BIOSTAT antibiotic treatment can help you profit through marketing poultry that is **SCIENTIFICALLY FRESHER.**

Extra advantages you get with BIOSTAT

FAST ACTING—BIOSTAT is highly soluble...dissolves instantly in chill tank water...does not foam.

METAL CONTAINER—BIOSTAT is delivered to you in special metal containers that will not absorb moisture ...will keep product in good condition. The containers have polyethylene liners. Enclosed in each container is an easy-to-use measuring scoop.

PLUS INGREDIENT—BIOSTAT contains citric acid which increases acidity and thereby also helps inhibit bacterial growth.

MORE CONCENTRATED—BIOSTAT is a 20% concentration of antibiotic activity. This means you order less weight. It simplifies handling.

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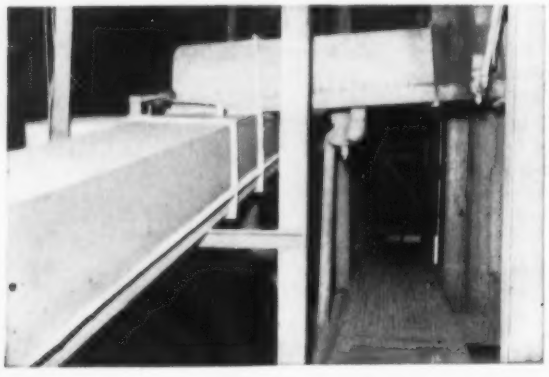

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QUESTIONS & ANSWERS

THIS MONTH'S PROBLEM

Spaghetti and Meat Balls

Question—Have you a good formula for putting up spaghetti and meat balls in 401 x 211 cans?

JANUARY PROBLEM

Cooling Brine Vegetables

The Question Was—We are faced with the problem of sterilizing chopped vegetables, which are saturated with pickling brine. Furthermore, the chopped vegetables should be cooled again after heat treatment. We have experimented with a jacketed kettle and find the process very slow, and the continued agitation very laborious. Can you suggest a better way?

Answer—You do, indeed, have a difficult problem. The form of this material is such that it cannot be handled in an efficient plate-type heat-exchanger or tubular heat-exchanger, for example, without danger of solids settling out and plugging the flow.

On the other hand, a jacketed kettle has the disadvantages you point out. Also, if agitation is imperfect, there is apt to be "burn-on", which will further reduce heat-transfer.

One possible way to lick this problem is to process the chopped vegetables in a special type of heat-exchanger—one that is essentially a screw conveyor with jacketed trough and hollow screw (Thermascrew, Rietz Mfg. Co., Santa Rosa, Calif.; or Holoflite, Western Precipitation Co., Los Angeles).

Trough and screw are fitted with connections for inlet and outlet of a heat-transfer medium—steam, hot water, Dowtherm, cold water for cooling, etc. Relative motion of screw and product accomplish the same effect as agitation in a kettle. It promotes rapid heat-transfer and avoids burn-on.

One operating advantage of such equipment is that you can bank the units vertically to provide a considerable amount of heat-transfer surface in relatively small floor space. Product could be fed to the top unit, which would be heated, and progress downward by gravity from one to another through as many stages of heating and cooling as are required for your process.

Probably you could also process this material in another type of heat exchanger (Votator, Girdler Corp., Louisville, Ky.). This is a special tubular unit having internal rotating elements to maintain clean heat-transfer surfaces. Space, however, must be allowed for removal of internal elements for cleaning purposes.

Your equipment cost could probably be reduced somewhat, if you could add enough brine or pickle liquor to fluidize the mass and then pump it through a tubular-type blancher, such as is standard equipment in many canneries. This unit is double-walled pipe of reasonably large diameter (as compared to tubular heat-exchangers), and perhaps could handle the product without clogging. You might be able to try this out experimentally through arranging a test run in some cannery that handles beans or the like, in an off-season.

Another Answer

Here's our suggestion for overcoming your January problem involving the sterilizing and cooling of chopped vegetables containing pickling brine:

Use hollow screw heat-exchangers. Two units operating in series, with the first doing the sterilizing and the second the cooling, would be ideal. The screw conveyor would not only do the heating and cooling but would also agitate the material as it progressed continuously through both units.

Hollow screw conveyors can be supplied in any size to handle any capacities. Also, requirements for a batch basis operation could be met by use of twin screws in a single trough.—*W. S. Enochian, Rietz Mfg. Co., West Chester, Pa.*

Troubled by Corrosion

Question—We have encountered serious corrosion problems in two pieces of equipment. One involves nickel heating coils (for cooking a tomato-base condiment), which are very efficient since we cook our batches very rapidly. However, these coils last only a few seasons.

The other unit is a plate-type heat exchanger used for cooking and cooling of a product containing salt and vinegar. In this case, thin stainless-steel plates have pitted so rapidly and badly that we are forced to look for another material. We've heard that titanium is corrosion resistant. Do you think it suitable for both applications?

Answer—You are wise to consider this possibility, for titanium is finding more and more uses as advances in metallurgy bring down its price. Let's consider first your replacement for nickel heating coils.

Titanium can be fabricated into coils with ample strength. Its resistance to corrosion by organic acids is generally very good. But the surest way to satisfy yourself on its corrosion rate would be to obtain test samples for actual exposure and measurement. (A leading supplier of this metal is Rem-Cru Titanium Co., Midland, Pa.) There is not, as yet, too much published data on corrosion-resistance of titanium in food processing. Cooking performance, when using titanium coils, would more closely approximate that of stainless steel (rather than the more heat-conductive nickel).

In the heat-exchanger, however, you would not lose heat-transfer efficiency by using titanium since you are presently getting along with the thermal conductivity of stainless steel. In this case, the known high resistance of titanium to chloride

HOW TO DO IT?

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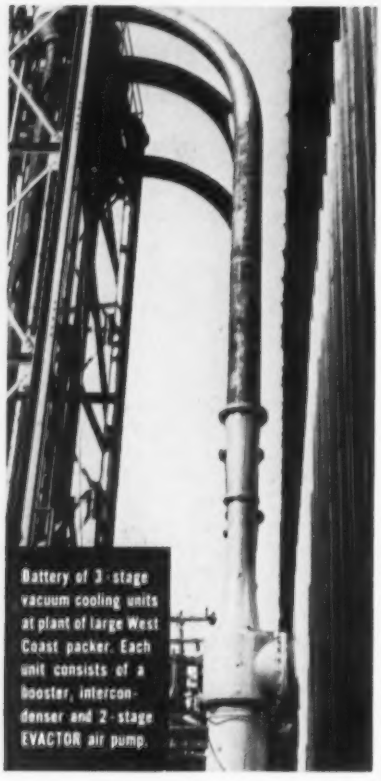
Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

THREE-STAGE VACUUM CHILLING PROTECTS VEGETABLES



Battery of 3-stage vacuum cooling units at plant of large West Coast packer. Each unit consists of a booster, intercondenser and 2-stage EVACTOR air pump.

WITH this Croll-Reynolds CHILL-VACTOR installation, lettuce and other vegetables can be cooled almost instantaneously to any temperature desired, without danger of freezing. This rapid chilling action removes the heat stored up in leafy vegetables, greatly prolongs their shelf-life and improves their appearance.

The Croll-Reynolds Company have been pioneers in the field of vacuum precooling of vegetables — having cooperated with the original produce shippers who used this process. Other food applications include deodorization of edible oils, meat cooling, evaporation of milk, juice concentration and de-aeration, distillation and manufacture of essential oils, etc.

For all your cooling and process vacuum requirements, call on Croll-Reynolds ...specialists in applying vacuum to food processing and cooling.

CROLL-REYNOLDS

Croll-Reynolds CO. INC.

Main Office: 751 Central Avenue, Westfield, N. J.
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CHILL-VACTOR UNITS
EVACTOR STEAM JETS • CONDENSING EQUIPMENT

corrosion (which as you point out can cause pitting of some stainless steels) would be an advantage.

Again, best way to determine the life of titanium in your service would be to expose and measure test samples. From the corrosion rate indicated, it will be possible to form an idea of the relative service life of titanium compared to your experience with stainless. It will then become a problem of costs and economics to decide whether the higher initial cost of titanium can be justified.

Recent calculations by titanium suppliers have shown that when difference in weight and labor costs of fabrication are taken into account, titanium equipment may be expected to cost about three times as much as stainless steel. If it lasts three times as long, or longer, it would be a worthwhile investment.

Worried by Termites

Question—We're a bit concerned about what appeared to be termites sighted in flight near some of our wooden buildings. Do you know how long it would take termites to do any damage? And what control measures might we adopt?

Answer—Termites that you see in flight have paired off to start a new colony. It takes six years to build up a colony to the point where they can do considerable damage to a wooden structure. Normal life of a termite is five years, although some entomologists believe that they may live for 25 years. And some colonies have existed for 50 years, their numbers being in the tens of thousands.

If termite injury has been noted, a reliable local exterminator should be consulted. For new wooden structures, it might be wise to flood the foundation area with one of the following insecticides so as to get five or more years of protection.

1. *Chlordane*, in either a 1% oil solution or water emulsion may be used. Chlordane comes in either 46-48% (4 lb. per gal.) or in 75% (8 lb. per gal. concentrations, and these should be mixed on a weight basis. For example, 1 gal. of 48% emulsion has 4 lb. of chlordane, and should be mixed with 5 gal. of water. Water weighs about 8 lb. per gal. This spray should thoroughly saturate a trench around the foundation.

2. *Dieldrin* is another good insecticide, which should be mixed at the rate of ½% in either oil or water, also by weight.

3. *Lindane* may also be used in either oil or water. In this case, an 8% solution (by weight) is recommended.

4. *Benzene Hexachloride* in an 8% solution with either oil or water is effective, but it leaves a foul odor for two or three weeks.

There are other insecticides that might be used. But these can be mixed only with oil, cannot give protection for as long a period, or are extremely poisonous to warm-blooded animals.

Note: Oils stain, may cause vapor barriers in building structures and can kill trees, shrubs, and flowers adjacent to buildings. However, they provide longer residual action.—*Robert H. Brewster, Associate County Agricultural Agent, Suffolk County Extension Service Assn., Agricultural Dept., Riverhead, L. I., N. Y.*

Q.—Have you a formula for anise drops (cookies)?

A.—Flour, 7 lb.; sugar (6X), 7 lb.; whole eggs, 1¾ lb.; egg yolks, ⅞ lb.; and aniseed, 3½ oz.

Potato Salad Formula

Re your problem on canned German potato salad (FE Feb. p. 167), here's a formula to use as a starter, modifying it to suit your requirements:

Potatoes (diced, cooked)	4.58 lb.
Onions (chopped)	0.33 lb.
Celery (chopped)	3.33 oz.
Bacon (¼-in. strips)	0.83 lb.
Flour	0.33 lb.
Cider vinegar	4.66 oz.
Water	3.66 oz.
Sugar	1.83 oz.
Salt	1.00 oz.
Pepper	¼ teaspoon.

Honey Caramelizes

Question—We hot-fill (165-175 F.) honey into glass jars with the result that the product caramelizes and loses flavor and aroma. Is there anything we can do to offset this?

Answer—Prolonged heating above 160F. is what's giving you difficulty.

Suggested is flash heating the honey to 170F. prior to filtering, immediately flash cooling to 120-130 F. after filtration, and filling directly into jars.

Processed in this manner, honey maintains its liquid state (doesn't granulate) due to careful temperature control, thorough heating, and efficient filtration.

What's more, it is brilliantly clear

High Speed Triangle Model D2A Filler Dispenses, Fills, Caps, and Codes Automatically

HERE IS a case where one new machine will do the work of two older style machines. It cuts labor costs in half, takes less than half the floor space . . . and sells for substantially less than two slower machines.

Any way you look at it, the Triangle Model D2A Twin-Line Filler is a real buy. Visualize fast, positive filling with no fuss or muss . . . absolute measuring accuracy . . . gentle handling of product — even handles large curd cheese without damage . . . an exclusive capper that handles even warped lids without jamming . . . tight, clean closures . . . quick, simple adjustment and clean-up . . . massive quality and ruggedness.

The Model D2A automatically handles all around nesting paper, and most plastic, containers up to and including 2 lb. size.

No matter what fillers you are operating, the Triangle Model D2A can do your job better, faster and cheaper.

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It's a fact. You can own a Triangle Model D2A Filler for only $2.80 per working day. It will earn you many times that much. Get the facts. Triangle will send you at no cost a new slide rule calculator that shows how to figure the cost per day of buying any new machine, taking into account tax savings. Mail the coupon today.

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Get 3-D color slide kit on free-loan basis — see the Model D2A in life-like views right at your own desk. Send for viewer and slides today — no obligation — use the convenient coupon.

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- ☐ Send free slide rule calculator
- ☐ Send 3-D viewer and slides on free-loan basis
- ☐ Have representative call

Name _____

(CLIP TO YOUR LETTERHEAD AND MAIL)

In JENKINS Monel-seated Bronze Gates

THE WEDGE TAKES THE WEAR - *and spares the rings*

Easy replacement of the wedge only — right on the line — restores full efficiency

THE MONEL SEAT RINGS are expanded into the body to assure a positive, leak-proof joint. Exhaustive tests in typical monel-seated gate valve services show that this permanent all-around support of the rings is essential to guard against deforming, loosening, or shifting.

THE RENEWABLE WEDGE (bronze or nickel alloy) has excellent wear resistance, but has a lower degree of hardness than the heat-treated Monel rings, which have optimum resistance to erosion and corrosion as well as abrasion. Thus, wear of the wedge leaves the rings relatively unaffected. When necessary to renew the wedge, you simply remove the valve bonnet, slip the old wedge off the stem, and slip on a new one.

GET PRACTICAL, LOW-COST RENEWABILITY in the valves you choose for the tough, punishing services that require Monel-seated gates. Compare . . . there is nothing simpler, faster, or more economical than Jenkins replaceable wedge design — and you also get the *plus* of Jenkins *extra value* in every other feature. Jenkins Bros., 100 Park Ave., New York 17, New York.

MADE WITH BRONZE OR NICKEL ALLOY WEDGE

The bronze wedge provides lasting economy for most applications. The nickel alloy wedge provides extra resistance where rapid wear and corrosion are factors.

JENKINS BRONZE GATES WITH MONEL SEAT RINGS

200 psi	300 psi
Fig. 270-U, Bronze Wedge	Fig. 280-U, Bronze Wedge
Fig. 270-UN, Nickel Alloy Wedge	Fig. 280-UN, Nickel Alloy Wedge
Fig. 270-UL, Bronze Wedge, U.L. approved for L.P.G. Services	350 psi Fig. 280-UX, Bronze Wedge

JENKINS BRONZE GATES INCLUDE 40 DIFFERENT PATTERNS

125 • 150 • 200 • 300 • 350 psi SOLID WEDGE • SPLIT WEDGE
SCREWED • FLANGED • SOLDER END • SOCKET END QUICK OPENING

Call your local Jenkins Valve Distributor for complete information.

JENKINS VALVES

LOOK FOR THE JENKINS DIAMOND

SINCE 1864 TRADE JENKINS MARK

Jenkins Bros

and without surface scum. Because of short exposure to processing temperature, there's no caramelization or detectable loss in aroma and flavor.—*Information from Sparkler Mfg. Co., Mundelein, Ill.*

Poor Labeling

Question—Being makers of macaroni, spaghetti and noodle products, we're interested also in producing related items such as canned sauces. Canning is unfamiliar to us, so we've set up a "pilot" operation with second-hand equipment for the most part, to gain experience and work out the "bugs."

However, one thing seems to bother our sales staff. It's lack of perfect can-label registration when running our wrap-around labeler. Sales maintains that this off-register at the lap is excessive and detracts from appearance of the can. It will not agree to offer our product until this condition is corrected.

Can you offer suggestions as to cause and cure of this condition?

Answer—First of all, you must have your labels properly and squarely cut, or they'll certainly be out of register at the lap.

Is it possible that in your pilot stage you have been cutting labels with a handcutter? Or have they been made up by someone not familiar with the precision required for automatic labeler operation?

These are the first points to check.

Next, we suggest that you carefully inspect the labeler. If it is a second-hand one, as is suggested by your question, it might not be in best mechanical condition.

Here are some checks you might make to trace causes of faulty labeling: (1) Badly worn back guide rail, (2) worn ramps or guide tracks, (3) worn out carrier rolls or their brackets, (4) pick-up gum on belts, (5) guide rail out of alignment and (6) improperly adjusted curling bar.

If the machine is in good condition and properly adjusted, you can maintain registration at the lap to ⅛-in.

If you do go into commercial production of a wrap-around labeled can, you could further safeguard label appearance by installing an electronic label inspector. Such a device is capable of keeping up with the high speed of can labeling, while it checks each can for absence of label, badly off-registered label, or an improperly glued label. Whenever defects are detected, it automatically rejects cans for relabeling.

FREE . . . A NEW BOOKLET ON
cutting production costs
How 35 Manufacturers saved with USS CYCLONE PROCESSING BELTS
Our new booklet, "How 35 Manufacturers saved with USS Cyclone Processing Belts," contains 35 actual case histories of savings on production costs, materials, time, space, breakage and labor . . . through use of Cyclone Belts.
USS Cyclone Steel Processing Belts are available in many sizes, types and finishes. In plants all over the country they are paying for themselves again and again in higher production rates, reduced manual labor and increased efficiency. One or more of these 35 case histories are bound to show how you, too, can save with a Cyclone Belt. Be sure to mail the coupon for your free copy today.
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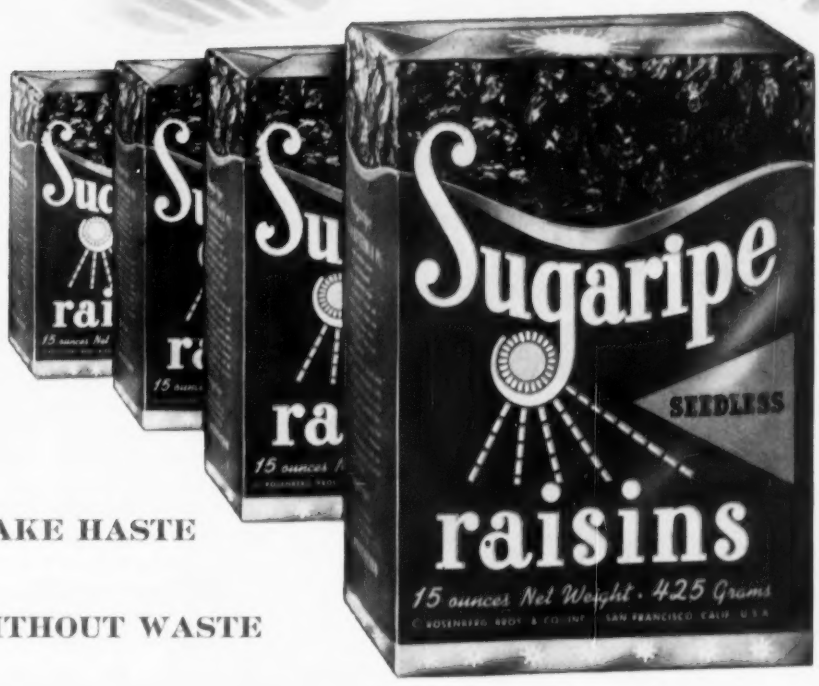
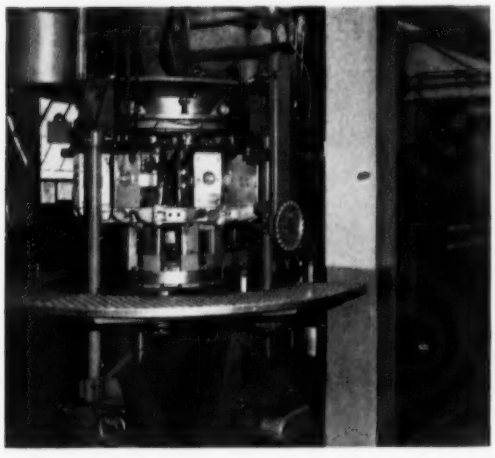
Choose Super STANISEAL Wax
To help cut production costs and wastes . . . to help make more sales at store and doorstep.
Super STANISEAL Wax is a blend of wax and polyethylene. This blend is completely compatible. It never separates out in machines or in storage. And the Super STANISEAL Wax formulation is carefully balanced to provide two important benefits. It coats each carton thoroughly, enhancing rigidity and minimizing bulging. It possesses enough flexibility to eliminate flaking. With Super STANISEAL Wax you get better leveling of wax on carton bottom. There is less scuff off of wax on machines.
The smooth rich finish you get with Super STANISEAL Wax means a more attractive carton. Level coating and crystal clarity give sharpness to colors. Fine satin-like feel increases saleability.
Find out more about Super STANISEAL Wax. Call your nearby Standard Oil office. There is one near you in any of the 15 Midwest and Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.
Quick facts about Super STANISEAL Wax
• Eliminates wax flaking in the milk.
• Better leveling of wax on bottom of carton.
• Greater carton rigidity. Less bulge at filling, in storage, after delivery.
• Clear, clean appearance of carton printing.
• Less scuff off of wax on machine.
• Smooth finish with no serpentine effects.
STANDARD OIL COMPANY
(Indiana)
STANDARD

A SURE WEIGH...



TO MAKE HASTE

WITHOUT WASTE



Installation of Pneumatic's Small Velocitron machine in production of Sugaripe raisin packages.

Each and every overweight package that goes out of a plant takes money out of the producer's pocket. Yet it is safe to say that millions of dollars are given away yearly in this fashion. Underweights invite damaging criticism. A great deal of this *can* be avoided, by better packaging methods.

Shining example in the fruit field is Sugaripe raisins. This product of Rosenberg Bros. & Co. of San Francisco is packed with a high degree of accuracy and uniformity at speeds up to 180 packages per minute. It is packaged on Pneumatic Velocitron equipment which employs net weighing, rather than the less dependable volumetric method.

Velocitron feeds and sets up the cartons, bottom seals and fills them — *with fractional ounce accuracy* — then top closes them to complete the job. Eight Pneumatron weighing heads measure exact weight of goods by a new "air pressure" principle — an innovation which produces the best net yet. Costly overweights and critical underweights are eliminated!

Advanced design and "lower cost per container" operation are Pneumatic trademarks — good guides to good buying when you're in the market for packaging or bottling equipment.

PNEUMATIC SCALE CORP., LTD., 91 Newport Ave., Quincy 71, Mass.
Also: New York; Chicago; Dallas; San Francisco; Los Angeles; Seattle; Leeds, England. Canadian Division: Delaware & Williams Company, Ltd., Toronto.

★PNEUMATIC

Packaging and Bottling Equipment

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Here's the Nation's NO. 1 Nitrogen Gas Generator

Only Gas Atmosphere's new Nitrogen Generator has all the features you have asked for in a production generator. It comes as a COMPLETE PACKAGED UNIT ready to be set on stream with a minimum of make ready. EXCLUSIVE AUTOMATIC TURN-DOWN enables production coincident with demand, eliminating gas waste. SIMPLIFIED RATIO CONTROL assures uniform gas analysis always. SINGLE BURNER OPERATION means easier combustion control. This new generator develops HIGHEST PURITY NITROGEN and, where required, CO_2 can be obtained from the same unit simultaneously. Here is truly the nation's top nitrogen generator. Be sure you look into it before you buy.

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equipment for producing industrial gases

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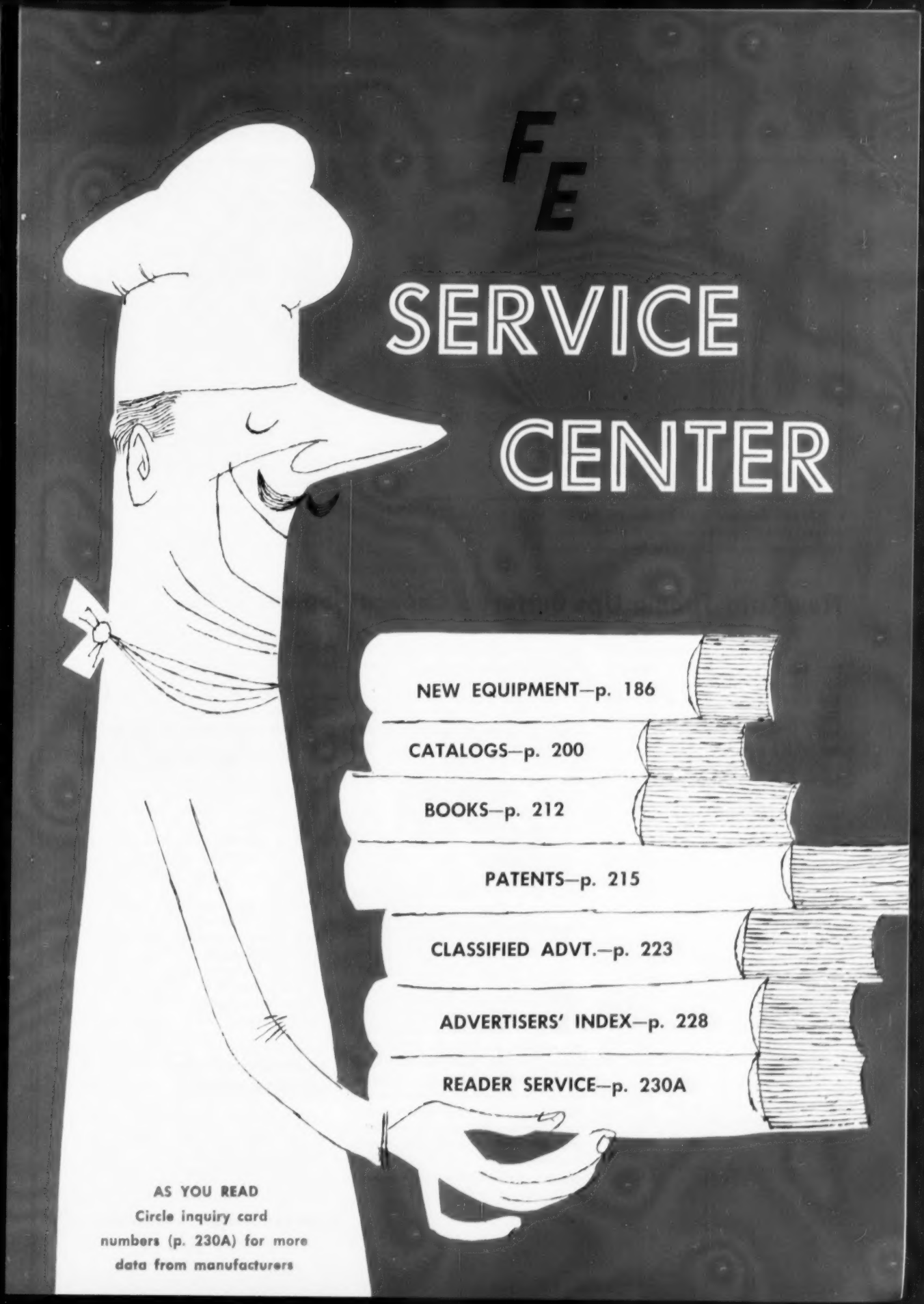
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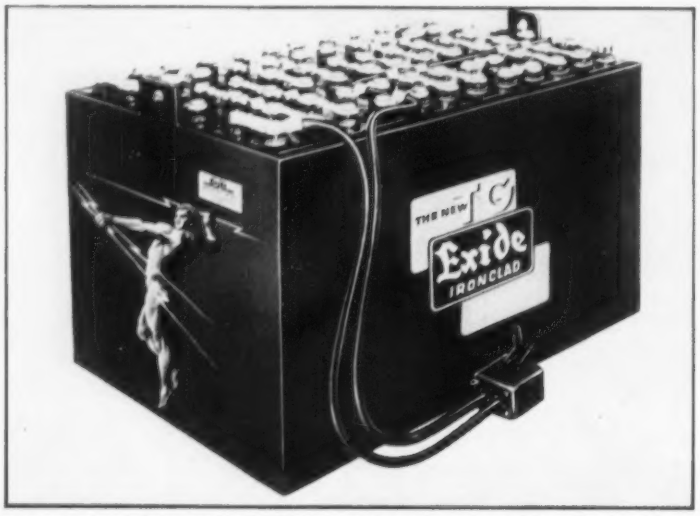
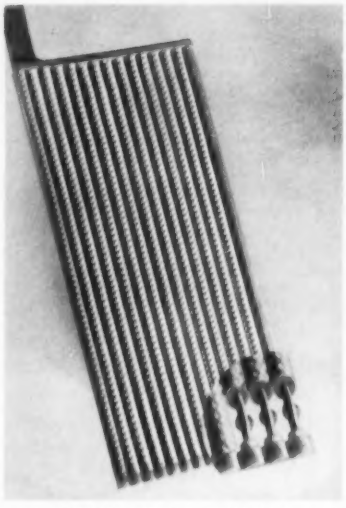


COMPACT STORAGE BATTERY for industrial trucks provides 72 amp.-hr. per positive plate for greater equipment productivity. This 20% increase in capacity, over conventional batteries of the same size, results from use of . . .



. . . **NEW SPINE TUBING** that curbs loss of plate material. Thus less "accumulation space is required.

New Grid Tubing Ups Battery's Capacity/Space Ratio

This industrial-truck storage battery weighs 6% more than maker's conventional unit of the same size. But for the extra weight, it provides 20% greater ampere-hour capacity and a 21% increase in watt-hour rating (at the 6-hr. discharge rate).

Packing more power into the same battery space now permits greater equipment productivity for users of industrial trucks. Or where present battery capacity is adequate, they can obtain the same power in less space for greater interchangeability of equipment and reduced costs. In addition, new unit is termed particularly effective at high discharge rates.

Furthermore, this development points the way to new concepts in truck design involving continuous operation, load capacities, travel and lift speeds, and maneuverability. Also, it eliminates a major barrier to further cutting of truck dimensions, which would boost utilization of valuable aisle space.

Key to this improved battery performance is use of a new type of armored porous tubing. Made of polyvinyl chloride and braided glass fibers, it encases grid spines and active material of positive plates to curb loss of electrode through shedding. This does occur in the conventional battery and active material gradually builds up at the bottom of the cell. Thus, valuable space is lost in providing for this accumulation.

Although porosity of the new tubing is very high, openings are so minute that virtually no particles get through. Therefore, new unit (TG Exide-Ironclad) makes more efficient use of space.

Tubing is highly permeable to diffusion of electrolyte and passage of current, which facilitates electrochemical action. Yet it is impervious to attack by battery acid. This factor, plus tube's securely interlocked and reinforced construction, make for dimensional stability.

In addition to the new tubing, unit employs a special alloy (Silvium) for positive plates, which gives high resistance to electrolytic corrosion. Tube sealers of polyethylene are used and these are bonded to bottom of tube assembly. Insulation between positive and negative plates consists of micro-porous separators that keep electrolyte in contact with positive tubes. Negative plates are specially designed and processed to develop positive-plate efficiency.

Batteries are available in finished steel trays in 11 sizes with 11-33 plates, capacities ranging 360-1,152 amp.-hr. at the 6-hr. discharge rate. —*Electric Storage Battery Co., Exide Div., Box 8109, Philadelphia.*

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Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service Postcard — back of book. Then sign at the bottom and mail. For your convenience, too, items in this department are listed and keyed in the Reader Service Section.

Air Pollution Curbed By Smoke Indicator

Control of air pollution may now be simplified by a new unit that continuously indicates concentration of smoke in flue gases.

Called Type EHA, it employs red and green warning lights that signal when smoke is out of bounds, and a 4½-in. meter that indicates color of flue gas. Instrument is designed for flush or surface mounting, and is operated by a photoelectric cell mounted at the boiler outlet. Smoke density is immediately converted to a meter reading.

A hermetically-sealed time-delay contact can sound an audible alarm a few seconds after red light warns of excessive smoke. This time-delay feature prevents occasional puffs of smoke from sounding the alarm.—*Brooke Engineering Co., 4517 Wayne Ave., Philadelphia.*

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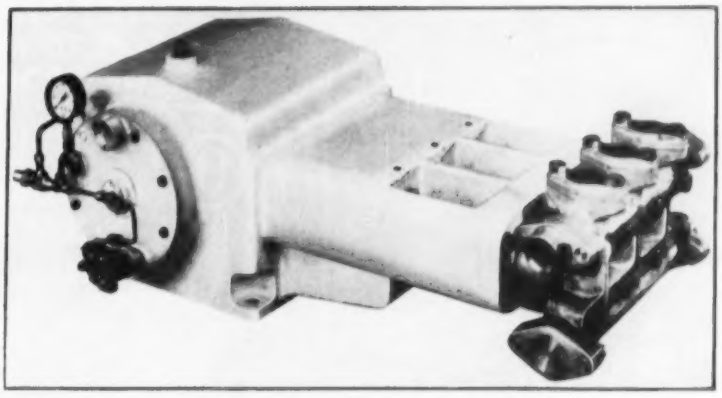

Sanitary Triplex Pump Offers Service Flexibility

Versatility is an outstanding advantage of a new line of sanitary triplex pumps for handling slurries with viscosities to 40,000 cps. Capacity ranges 10-30 gpm., pressure from 450-1,500 psig., and maximum recommended speed is 150 rpm.

To adapt these compact units to individual service conditions, standard design may be varied as follows: Materials of construction and type of drive may be specified; plungers can have packing, cups, or "O" rings; ceramic or special alloys may replace the standard Stellite valve trim; flanged or sanitary connections can be used, and higher pressures may be accommodated at reduced displacements.

Single-acting cylinders are available with bores of 1½, 2, 2⅜, or 2¾ in. Stroke is 2¾ in.—*The Girdler Co., Votator Div., Louisville, Ky.*

Circle 187B on Reader Service Card

Closes Foil Containers At 2,700 per Hr.

Offering automatic cover feed, this unit closes aluminum foil containers at up to 2,700 per hr. Furthermore, several types of covers can be used and a new heat-sealing device provides liquid-tight seals.

Arrival of the container (by conveyor) cycles the machine (Number V) to pick a lid from the magazine, then apply and close it. Sealed unit is delivered ready for case packing.

Vertical-flange containers having disk covers are closed by clamping the rim of the container over the cover. Flat-hood or raised-hood covers can be wrapped around a full curl rim and crimped.—*Ekco-Alcoa Containers Inc., Wheeling, Ill.*

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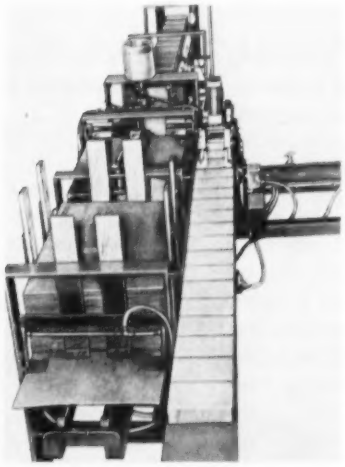

Compact Machine Offers Complete Casing Cycle

Here is a unit specially designed to automatically open and form cases, accumulate the contents, insert into the case, glue, and seal. Typical applications include loading of canned and powdered milk, and cartons of cereal, sugar, and lard.

In operation, cases are selected from a stack at end of machine (Quadnumatic), carried forward one at a time, then brought into the open and formed position adjacent to an accumulator magazine. When required number of packages have been accumulated, unit trips and a plunger inserts load into case.

This action starts the filled case forward, carrying it through gluing and folding arms into a pressure-sealing unit. Simultaneously, another stacked case is opened and formed to complete the cycle. Unit has no continuously moving parts, and is pneumatically operated.

Machine is about 16 ft. long and 30 in. wide. A side projection for the accumulator section measures about 15x40 in. Unit is completely assembled, but shipped in three sections to facilitate handling.—*Schroeder Machines Corp., New Court Ave., Industrial Park, E. Syracuse, N. Y.*

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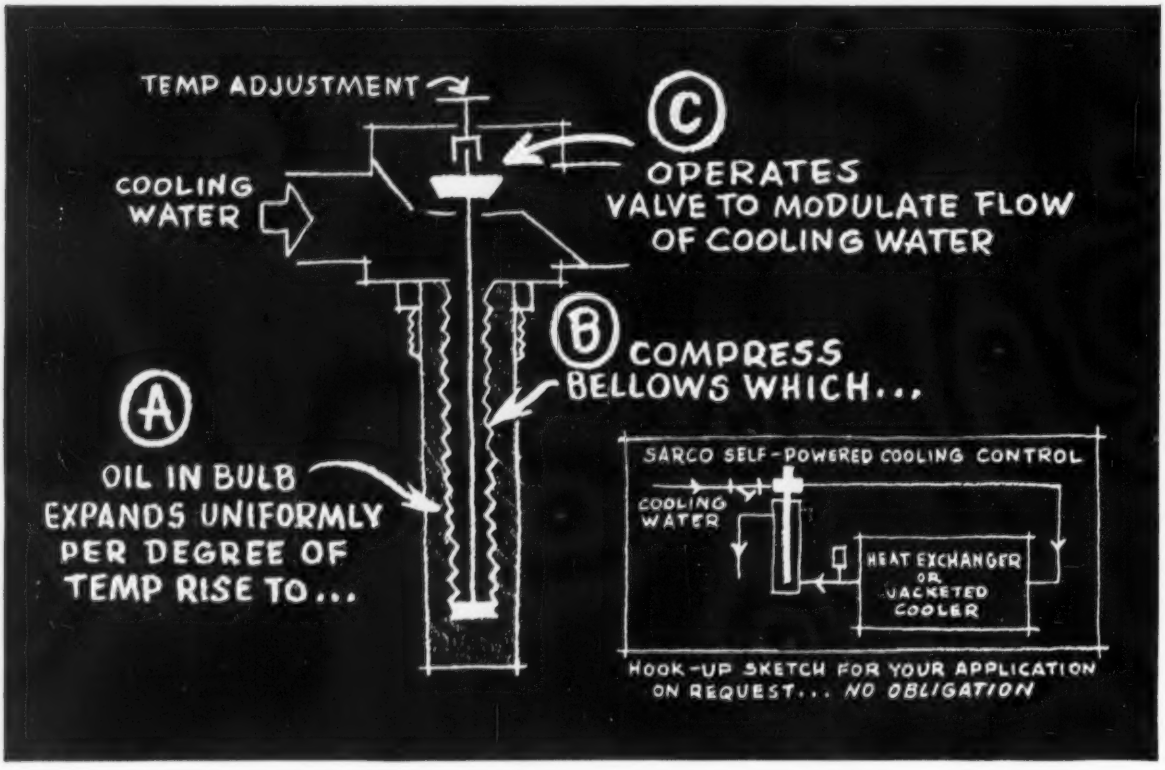
CUT OUT AND FILE


TEMP ADJUSTMENT
COOLING WATER
C
OPERATES VALVE TO MODULATE FLOW OF COOLING WATER
B
COMPRESS BELLOWS WHICH...
A
OIL IN BULB EXPANDS UNIFORMLY PER DEGREE OF TEMP RISE TO...
SARCO SELF-POWERED COOLING CONTROL
COOLING WATER
HEAT EXCHANGER OR JACKETED COOLER
HOOK-UP SKETCH FOR YOUR APPLICATION ON REQUEST... NO OBLIGATION

Simple, inexpensive way to end waste and hazards of overcooling

WHEN cooling water is manually controlled ...the operator is forced to play it safe by leaving the water valve wide open to compensate for variables in the load and water pressure and temperature. Result—*overcooling*. If he tries to vary the flow of water...he risks *undercooling*.

It pays to take responsibility off the operator's shoulders. Optimum *safe* temperature can be automatically assured by using Sarco Cooling Controls. They eliminate both overcooling and undercooling. They replace guesswork with certainty. Save man-hours and cooling water. Prevent damage to equipment.

Simple and Trouble-Free

Simple, trouble-free design—as you can see above, a temperature control need not be complicated! Self-powered...no electricity or compressed air required. Self-contained...no exposed mechanism. Packless...no packing to wear or leak.

Each year, thousands of these fully modulating and sensitive Sarco Controls provide dependable service for firms such as Ingersoll-Rand, Butler Manufacturing Co., and Swift & Co.

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The low price makes it possible for you to use Sarco AUTOMATIC temperature controls for ALL control jobs, not just the big ones! For example, the ¾" size costs only about $39! Mail the coupon now.

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3188-B

Cite Filtering Efficiency of Cellulose Cartridge

High-clarity polishing of fluids with no contamination or impairment of flavor is reported for a new 5-micron (0.0002 in.) filter cartridge. Typical applications include filtering of water, wine, vinegar, fruit juices, and oils.

Unit (Micro-Klean) is made of white cellulose and bonded with an inert resin. Graded density, which traps out larger particles early in the flow path, prevents plugging of finer filter barriers that follow. Cartridge fits most standard filter housings.—*Cuno Engineering Corp., Meriden, Conn.*

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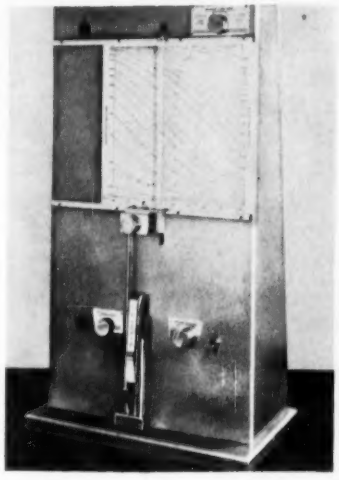

Unit Gives Direct Reading Of Average Particle Size

Redesign of this compact unit makes gaging of average particle size a quick and easy operation. Test conditions are standardized to permit direct reading from a calibration chart.

Known as Sub-Sieve Sizer, instrument measures resistance of a uniformly packed powder column to air flow, which is related to particle-size distribution. Unit covers two micron ranges: 0.2-20 and 20-50.

A new clamp assembly holds the sample tube in place with an airtight seal.—*Fisher Scientific, 345 Fisher Bldg., Pittsburgh 19.*

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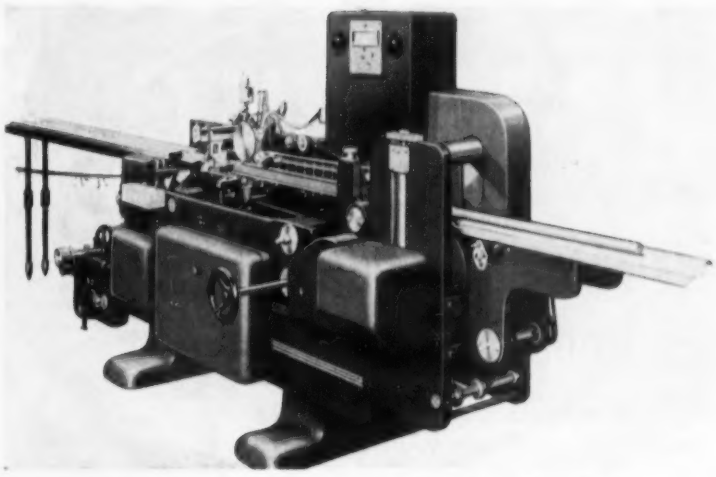


Wrapping Unit Gives Positive Seals With Polyethylene

Developed especially for automatic packaging with polyethylene, this high-speed unit reportedly solves the sealing problem.

Called Campbell Poly-Wrapper, it uses a continuous-feed "float" wrapping process. The plastic web is passed through a tube former, then is floated completely around the fed item. Next, tube-wrapped product is sealed lengthwise, then ends are formed, sealed, and cut to length.

Key to this technique is precise control of tube and cross-sealing, which provides the dwell time necessary for a positive seal.

Unit handles products of regular or irregular shape, uses a minimum of poly, and requires no stiffening boards unless desired for merchandising purposes. One operator runs the machine, and automatic feeds and deliveries are optionally available—*Hudson Sharp Machine Co., Green Bay, Wis.*

Circle 189C on Reader Service Card

Automatically Adds Water To Correct Height

For longer battery life, this cell filler controls electrolyte level automatically by adding water to the correct height.

Unit (Rite-Hite), which is connected to a 20-50 psi. water supply, consists of a long tube for reaching across large batteries, and a hydrostatic flow control. With end of tube inserted in cell opening (to proper depth as determined by a stop on tube), flow is started by a lever that operates a spring valve.

When electrolyte level covers end of tube, partial vacuum in an internal copper tube stops the flow by causing a diaphragm within the housing to release the spring valve.

Fillers are available in five models —three horizontal, two vertical. The 15-in. horizontal and 9-in. vertical units are best adapted to industrial-truck use. Fillers also are handy for washing top of battery cells, preferably before they are filled and with vent plugs in place.—*Gould-National Batteries, Inc., Trenton, N. J.*

Circle 189D on Reader Service Card

CONTOUR-TRENTWELD

welded stainless pipe that's smoother, stronger

New Contour-Trentweld outperforms any other pipe, welded or not. Here's why: *Contour-Welding* is an entirely unique method of producing pipe and tubing. It puts gravity to work to pull down the molten weld metal until it exactly conforms to the contour of the pipe. Result: A smooth pipe or tube free of undercut or bead.

What's more, the *Contour-Weld* process *starts* with uniformly rolled stainless strip, which insures constant wall thickness throughout the pipe.

But the only way you can fully appreciate the advantages of new *Contour-Trentweld* is to try it. We think you'll agree, *it can't be beat by any other pipe, welded or not.*

Why Trent's Exclusive Contour-Welding Process Means Smoother Welds . . .

Normally, in producing welded pipe, the weld is made at the top. But gravity plays a nasty trick. It tugs at the fluid metal in the weld zone, pulling it down toward the middle of the pipe. The result, particularly in the heavier gages, is a perceptible bulge where it hurts the most – right on the I.D. surface. If you try to get rid of the bulge – at fair cost – the metal is undercut – and corrosion and erosion start there.

But Trent put a stop to that – simply by going into partnership with gravity. With their exclusive *Contour-Welding* process, they weld at the bottom – and gravity works for them. For then, the bulge is in the opposite direction – blending in perfectly with the contour of the pipe itself.

CONTOUR TRENTWELD

Stainless and High Alloy Welded Tubing

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN (Subsidiary of Crucible Steel Company of America)

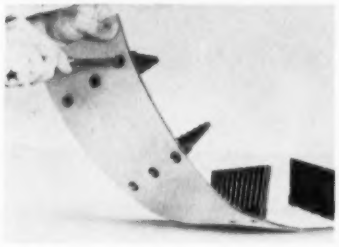
Ceiling Fixture Provides Light, Air Distribution

Seen cutting the cost of air-conditioning is a new ceiling fixture that provides ventilation and lighting.

Dual-purpose unit (Multi-Vent Troffer) looks like an ordinary recessed fluorescent. However, it conceals a built-in air diffuser mounted above the reflector plate, and distributes air which bypasses the lamp. Uniform air temperature is provided by low-velocity air displacement. Tests indicate that overall light output is increased when unit operates with duct temperatures of 70-130F.

Fixtures are offered in louvered, baffled, and open-troffer types.—*Pyle National Co., 1334 N. Kostner, Chicago.*

Circle 191A on Reader Service Card



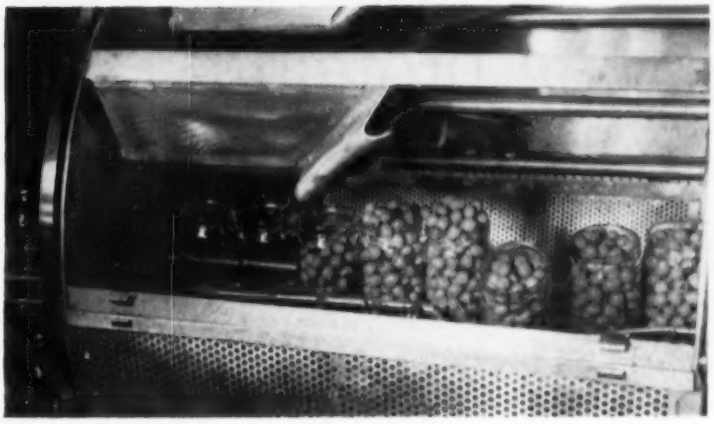
Molded Neoprene Cleats Easily Attached to Belt

Any conveyor or elevator belt may readily be converted to a cleated unit with use of this molded Neoprene screw-on cleat. A punch and a screwdriver are all that is needed.

Applications include conveying in grain and vegetable-oil mills, and elevating of olives and pickles from corrosive vat solutions. Resistant to oil, heat, and mild acids, units (Tatch-a-Cleat) are available in heights from $\frac{5}{8}$-3 in., widths from $1\frac{1}{2}$-24 in.

Cleats are attached to a belt by flat-head machine screws and special countersunk washers secured to threaded metal inserts. Latter are vulcanized in the base of the cleat and are embedded in concave cups. Belt is pulled into cup when screw is tightened against washer. Thus, both screw-head and washer are below belt surface, where they cannot contact pulley.—*T. H. Hinchcliffe, 1450 La Loma Rd., Pasadena, Calif.*

Circle 191B on Reader Service Card



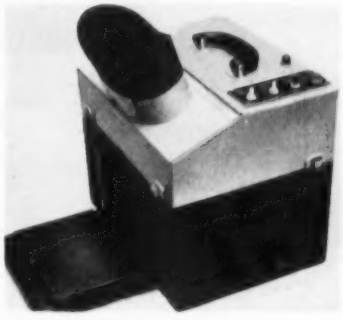
Versatile High-Speed Filler Curbs Product Damage

Incorporating a new principle of food delivery and volume control, this automatic filler offers efficient packing of fruits, vegetables, beef stew, and wet or dry cut items.

Known as Tumble Filler, it handles jars (to 1 qt.) and cans (to No. 10) at up to 300 per min., without bruising or shearing the conveyor-fed product. Unit employs a rotating drum with internal food-carrying buckets that gently deposit items by gravity. Volume is controlled by a spill-out tipper and a vibrator.

Packer is made of stainless steel and occupies 8x4 ft. of floor space. Changeover and cleaning from one item to another is said to take 5 min., while container sizes may be changed in 1 min.—*Solbern Mfg. Co., 120 13th St., Brooklyn, N. Y.*

Circle 191C on Reader Service Card



Ultra-Violet Unit Provides Rapid Sanitation Checks

A self-contained instrument for field or laboratory analysis, this fluorescence cabinet offers rapid and accurate identification of materials under ultraviolet light.

Typical applications include sanitary inspection of foods, detection of foreign fats in fluids, and chromatographic analysis. Unit (Mineralab) employs side doors for insertion of specimens, and spring-tension latches that keep the "dark room" light-tight. A microscope may be mounted on the front platform of the cabinet.

Equipment operates on batteries or on 110-v. a.c./d.c. Cabinet measures 14x12x14 in.—*Ultra-Violet Products, Inc., San Gabriel, Calif.*

Circle 191D on Reader Service Card

OTHER DEPARTMENTS

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Who said adding protein costs money?

He invests 1¢ in Pro-80 Vital Gluten . . . Gets a 3¢ to 5¢ premium on every loaf!*

This typical example of Pro-80 economy suggests possibilities for your products. For instance, if your foods now contain as little as 7½ percent protein, you can increase protein content to more than 11 percent with Pro-80 for only 1½ cents per pound of finished product. In addition, Pro-80 improves cohesiveness, often improves flavor, bite and tolerance—adds no taste or odor of its own.

Sale of Protein Foods on the Increase

Each year consumers become more aware of health and diet; foods with protein added become more popular. Get your products in step with this nation-wide trend . . . create new markets, new products. Use Pro-80 to enrich:

Cereals	Puddings
Breads	Baby Foods
Baked Goods	Health Foods
Macaroni Products	and many others

Easy to Use Pro-80 Vital Gluten (80% protein, moisture free basis) hydrates rapidly, blends smoothly, is bland and compatible. Standard package, 100 lb. bag.

**Cost of raising protein content of a 1 lb. loaf of bread 20% with Pro-80 Vital Gluten.*

GET MORE FACTS!

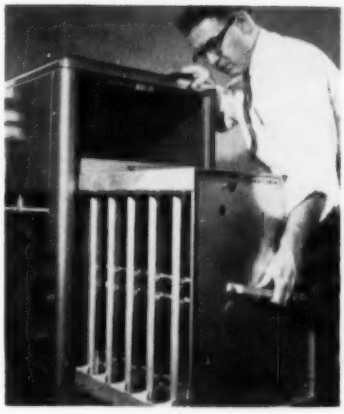
Send for booklet which shows how Pro-80 builds sales, profits. Write Special Commodities Division of General Mills, Minneapolis 1, Minnesota.

Pro-80 Vital Gluten, new wheat protein concentrate is made only by

SPECIAL COMMODITIES DIVISION

General Mills

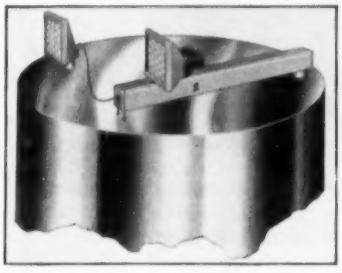
MINNEAPOLIS 1, MINNESOTA



High-Voltage Air Cleaner Traps Foreign Matter

Airborne particles get a positive charge in this unit's 13,000-v. ionizer section, and are attracted to negative collector plates.

Trapped particles are automatically removed by water spray.—*Minneapolis-Honeywell Regulator Co.*, 2753 *Fourth Ave. So., Minneapolis* 8.



U-V Unit Curbs Spoilage Of Stored Syrups

Mounted atop a liquid-sugar tank, this unit circulates filtered, sterile air to eliminate yeast and mold growth.

Known as Sterile Conditioning System, it consists of an ultra-violet germicidal tube and air intake, plus a vent. Unit keeps inside atmosphere below the dew point to prevent condensation, which would dilute surface of material in tank and permit growth of microorganisms.

Ultra-violet assembly is 52x4x14 in., fits a 3-in. pipe nipple, and operates on 115v. a.c.—*D. William Fuller Co., 2320 E. 75th St., Chicago.*

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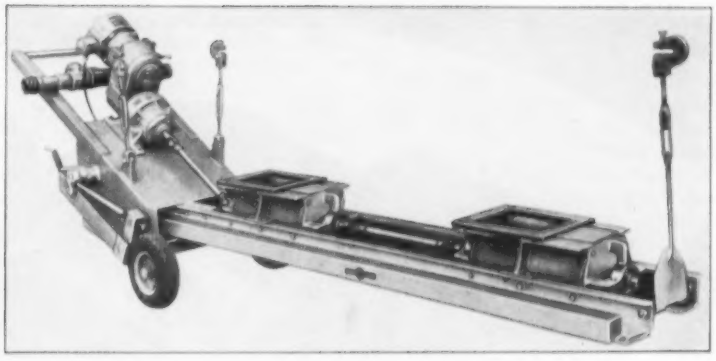


Portable Unloader Offers Efficient Bulk-Conveying

Attached to outlet of an Airslide car, this portable pneumatic unloader employs a variable-speed drive for constant flow into bulk-delivery bins or trucks. Capacity is about 17 tons per hr.

Called "Portaflow", it provides efficient conveying of bulk-shipped items such as starch, sugar, and flour. Unit is available for 3- and 4-in. dia. lines. The all-weather assembly is mounted on an aluminum frame, weighs 1,045 lb., and can easily be handled by two men.

For ease of operation, there is a NEMA type V magnetic starter with push-button controls at operator's fingertips. Also, each wheel of the unloader is independently adjustable, which allows for proper alignment of blow-through feeder flanges.

A simple clamp and turnbuckle arrangement securely attaches the assembly to car's frame, which prevents any leakage of materials during unloading. And unit has its own valves for regulation of air flow to car.—*Sprout Waldron & Co., Muncy, Pa.*

Circle 193B on Reader Service Card

New Plastic Wheel Offers Superior Performance

Numerous advantages are cited for this reinforced all-plastic industrial wheel, available in sizes of 3 to 12 in.

Designated "Lamilon", it offers high load ratings, impact strength, and abrasion resistance. Thus, wheel retains a smooth tread and concentricity in service, which guards against marring of floors. In addition, unit is spark-proof, has low water absorption, and resists corrosion by oils and chemicals.

Wheels have alloy steel roller bearings with steel outer races, and provision for pressure lubrication. —*Fairbanks Co., 393 Lafayette St., New York City.*

Circle 193C on Reader Service Card

Bin-Level Gage Approved For Hazardous Service

A paddle-type level indicator, employing a low-torque motor in an explosion-proof housing, has been approved for use in hazardous atmospheres.

This approval covers Class I, Groups C and D, and Class II, Groups E, F, and G. Included are atmosphere charged with dust and volatile chemicals.

Unit (Roto-Bin-Dicator) is designed to indicate or control the level

It's the Nash!

The ability of Nash Compressors to maintain original performance over long periods is no accident. Nash Compressors have but a single moving element, the Nash Rotor. This rotor is precision balanced for long bearing life, and it revolves in the pump casing without metallic contact. Internal lubrication, frequent cause of gas contamination, is not employed in a Nash. Yet, these simple pumps maintain 75 lbs. pressure in a single stage, and afford capacities to 6 million cu. ft. per day in a single compact structure.

Nash Compressors have no valves, gears, pistons, sliding vanes or other enemies of long life. Compression is secured by an entirely different principle of operation, which offers important advantages often the answer to gas handling problems difficult with ordinary equipment.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. Because there are no internal wearing parts, maintenance is low. Service is assured by a nation-wide network of Engineering Service offices. Write for bulletins now.

- No internal wearing parts.
- No valves, pistons, or vanes.
- No internal lubrication.
- Low maintenance cost.
- Saves floor space.
- Desired delivery temperature Automatically maintained.
- Slugs of liquid entering pump will do no harm.
- 75 pounds in a single stage.

NASH ENGINEERING COMPANY
312 WILSON, SO. NORWALK, CONN.

of any bulk item which will flow. Material build up stops the rotating paddle and stalls the motor. This actuates a Microswitch to control signal devices or equipment drives.—*The Bin-Dicator Co., 13946-77 Kercheval, Detroit 15.*

Circle 193D on Reader Service Card

INGREDIENTS

Maple Concentrate Offers High Flavor Strength

With this highly concentrated imitation maple concrete, processors of baked goods and confections may easily prepare their own maple extract. Product is also offered to manufacturers of imitation maple syrup.

A gallon of standard-strength extract may be flavored by 1¼ oz. of this concentrate (Maple Con). And 1¼ oz. flavors 120 gal. of syrup.—*Henry H. Ottens Mfg. Co., 129 Front St., Philadelphia.*

Circle 195A on Reader Service Card

Imitation Vanilla Flavor Doesn't "Bake Out"

A new synthetic vanilla, which withstands temperatures up to 500F., reportedly imparts pleasant and effective flavor to a variety of items.

Known as High-Heat Vanilla, it is especially recommended for wafers, biscuits, and cookies.—*Dominion Products, Inc., 10-40 44th Dr., Long Island City, N. Y.*

Circle 195B on Reader Service Card

CHEMICALS

Cold Adhesive Simplifies Wood-Floor Repairs

Factory mixed and ready to use, this material is designed for fast resetting of wood floors.

Called Blockset it is applied cold, which eliminates heating kettles, obnoxious fumes, and fire hazards. Thus, work may be done in sections.

Repairs are made by coating floor base with adhesive, fitting the blocks, inserting them in floor, and filling cracks. For resealing, product is spread over the surface with a squeegee. It dries quickly and can be trucked over within an hour after application. Being water resistant, adhesive also prevents moisture from penetrating cracks.

Material is available in 5-gal. cans and in 30- and 55-gal. drums.—*The Monroe Co., 10703 Quebec Ave., Cleveland 6.*

Circle 195C on Reader Service Card

Non-Corrosive Sanitizer Has Many Applications

Of interest to food processors is a new sanitizer, a non-corrosive, non-irritating agent that leaves no odor, taste, or film. Applications include sanitizing of pipelines, tanks, pails, walls, and floors.

Designated Heliogen (R), it is equally effective against bacteria, viruses, and fungi, and destroys them in 15 sec. Material is a near-white powder which dissolves instantly in hard or soft water, forming a clear solution containing non-toxic diatomic iodine. It is effective in either acid or alkaline solutions, and is active at prevailing temperatures.

Sanitizer is sealed in moisture-proof, batch-size packets for stability and accurate dosage.—*S. B. Penick & Co., Sanitizing Products Div., 50 Church St., New York City.*

Circle 195D on Reader Service Card

Crawling Insects Curbed By Potent Residual

Here is a new residual insecticide that has proved highly effective against immune or resistant roaches, cabinet and carpet beetles, and other common stored-product pests.

Termed Excelcide Stro-Mal Residual, it consists of strobane, malathion, pyrethrins, and synergists in a deodorized petroleum-distillate oil. This formulation gives an immediate kill of existing infestation, and provides a residual deposit that is effective for many days after application.

It is relatively odorless, non-corrosive, and non-staining.—*The Huge Co., 884-886 Hodiamont Ave., St. Louis.*

Circle 195E on Reader Service Card

BRIEFS . . .

Syrup-Throw Tester consists of calibrated glass tube that fits into aluminum holder shaped like beverage bottle. After passing through syruper at regular bottling speed, units are placed in rack having pins which raise tubes for easy reading.—*Consolidated Siphon Supply Co., Terriss Div., 22-24 Wooster St., New York City.* (195F)

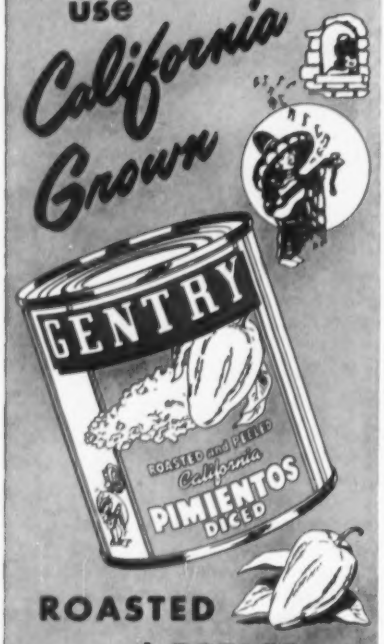
Compact Packaged Boiler, rated at 60 BHP, generates 400-1,750 lb. of steam per hr. (75-300 psi.) from 60-F. feed. Automatic controls adjust output for varying steam demand, and unit has safety devices. Dimensions: 84 in. long, 48 in. wide, 70 in. high.—*Vapor Heating Corp., 6420 W. Howard St., Chicago.* (195G)

New Spectrophotofluorometer provides rapid quantitative assay, fluorescent analysis, and identification of compounds in solution throughout 200-800 millimicron range. Compact instrument permits continuous activation of materials (only 1 ml. of sample required), and fluorescent spectrum can be photographed.—*American Instrument Co., Silver Spring, Md.* (195H)

Pneumatic-Tired Lift Truck (2,000-lb. capacity) employs new high-torque engine for greater power, repositioned instrument panel and uprights for faster, easier operation. Versatility of unit (Model QC) is boosted by optional clamp attachment, side-shift carriage, and LP-gas installation.—*Hyster Co., 2902 N. E. Clackamas St., Portland, Ore.* (195I)

Imitation Oil of Nutmeg, reportedly as flavorful but more stable than the imported oil, replaces the spice at rate of about 5 lb. oil to 100 lb. nutmeg.—*Polak & Schwarz, Inc., Culver City, Calif.* (195J)

Flour Dump-Sifter, handling 125-150 lb. of white bread flour per min., eliminates baker's dump bin, intermediate elevator and sifter. Integral unit (Readco) comprises a 200-lb.-capacity hopper, vibrating sifter, and

GENTRY
For better
FLAVOR...
more
COLOR...
use
California
Grown


ROASTED
and PEELED
DICED
PIMIENTOS
in No. 2½
and convenient No. 10 tins
ALL CLEAN ★ ALL USABLE
NO WASTE
GENTRY PIMIENTOS
MEET ALL FEDERAL
REGULATIONS FOR
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PRODUCTS
ask your distributor, or write
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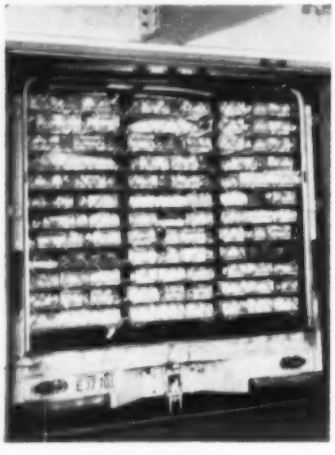
Los Angeles 54, California

screw conveyor. Sifter screen is quickly removable for cleaning or mesh change.—*Read Standard Div., Capitol Products Corp., York, Pa.* (195K)

New Sanitary Fittings for flexible plastic tubing are quickly and easily installed. Units (Model F, Sani-Lok) are available in three styles: Plain ferrule (1-3 in dia.), threaded ferrule (1-3 in. dia.), and plain ell (1½ in. dia.).—*Anderson Bros. Mfg. Co., 1907 Kishwaukee St., Rockford, Ill.* (196A)

Irradiated Polyethylene, made by bombarding the plastic with high-velocity electrons, offers outstanding insulating properties. Material (Irrathene) combines thermal stability for overload protection, high dielectric strength, and excellent moisture and chemical resistance.—*General Electric Co., Chemical Development Dept., Pittsfield, Mass.* (196B)

EQUIPMENT APPLICATIONS



Nesting Transport Racks Save Time and Space

Truck-loading and unloading time for baked goods has been cut some 40% through use of portable nesting racks at Helms Bakery, Los Angeles. Furthermore, a 78% saving in floor space is reported in stores and warehouses after bread-filled racks have been emptied by consumers.

Combined with shelves and dollies, these units constitute a complete handling system from bakery to distribution point. Stacked in tiers of 12 on dollies, they fit compactly into trucks. And through nesting, 56 racks occupy the same space required for 12 filled units, thus saving considerable space on return trips.

Each rack (Nestaway, Mid-West Metallic Products, Inc., 450 Film Bldg., Cleveland) holds an average of twelve 24-oz. loaves.

Circle 196C on Reader Service Card

Versatile Insulation Eases Warehouse Construction

Cellular glass insulation does double duty in a new −10F. warehouse for citrus concentrates at Libby, McNeill & Libby, Ocala, Fla. In addition to enveloping the refrigerated area completely, it acts as a structural member with compressive strength of over 7 tons per sq. ft.

Here's how the material (Foamglas, Pittsburgh Corning Corp., 1 Gateway Center, Pittsburgh) simplified the job. After the floor was laid, columns were supported on concrete pads bearing directly on the glass blocks. Then, roof insulation was installed on a steel decking.

Next, side walls went up along exterior walls, and through spaces left at the edges to link with the roof insulation. Concrete was then poured and the roof was built up. Finally, insulation was given a coat of aluminum paint for reflectance and appearance.

Circle 196D on Reader Service Card

Sanitary Tank Trailers Protect Syrup Purity

Transport units of stainless steel guard the quality of liquid sugar shipped from the Crockett, Calif., plant of California & Hawaiian Sugar Refining Corporation.

The 4,000-gal. tank trailers (Fruehauf Trailer Co., 10967 Harper Ave., Detroit) are completely smooth inside, thus absence of crevices or sharp angles facilitates mechanical cleaning. Furthermore, all piping and fittings are of stainless steel.

Loading the unit is a closed-system operation that prevents contact with air or foreign matter. It's done in 8 min. through a loading valve connected to a fitting on top of the tank.

Circle 196E on Reader Service Card

NOW...THE NEW TRAYMASTER CARTON FORMER!

Forms and Glues a Wide Variety of Cartons Without Messy Glue

Package's new TL-100 Traymaster produces cartons using the widest variety of board stocks, including polyethylene-coated and foil-lined. And with no messy glue! The TL-100 uses a rope-like thermoplastic adhesive that is automatically unwound from a spool, metered, melted and applied to the carton.

There's no glue pot to clean . . . no muss, no waste.

Occupying only 3 square feet of floor space, the TL-100 Traymaster is easily moved to the most convenient location. Available in three models for different carton sizes and speed ranges, the TL-100 will produce up to 100 cartons a minute in size ranges from 2" to 15" long, from 1⅝" to 11½" wide, and from ⅜" to 4" high. Only the simplest, least expensive blanks are required. Trays and cartons are formed with a smooth, unbroken inner surface, since the hinged flaps are sealed to the outside.

A single operator can tend several machines, needs only push the starting switches and keep the magazines supplied with blanks. For information about the money-saving, labor-saving TL-100 Traymaster, phone or write our nearest office.

PACKAGE MACHINERY COMPANY

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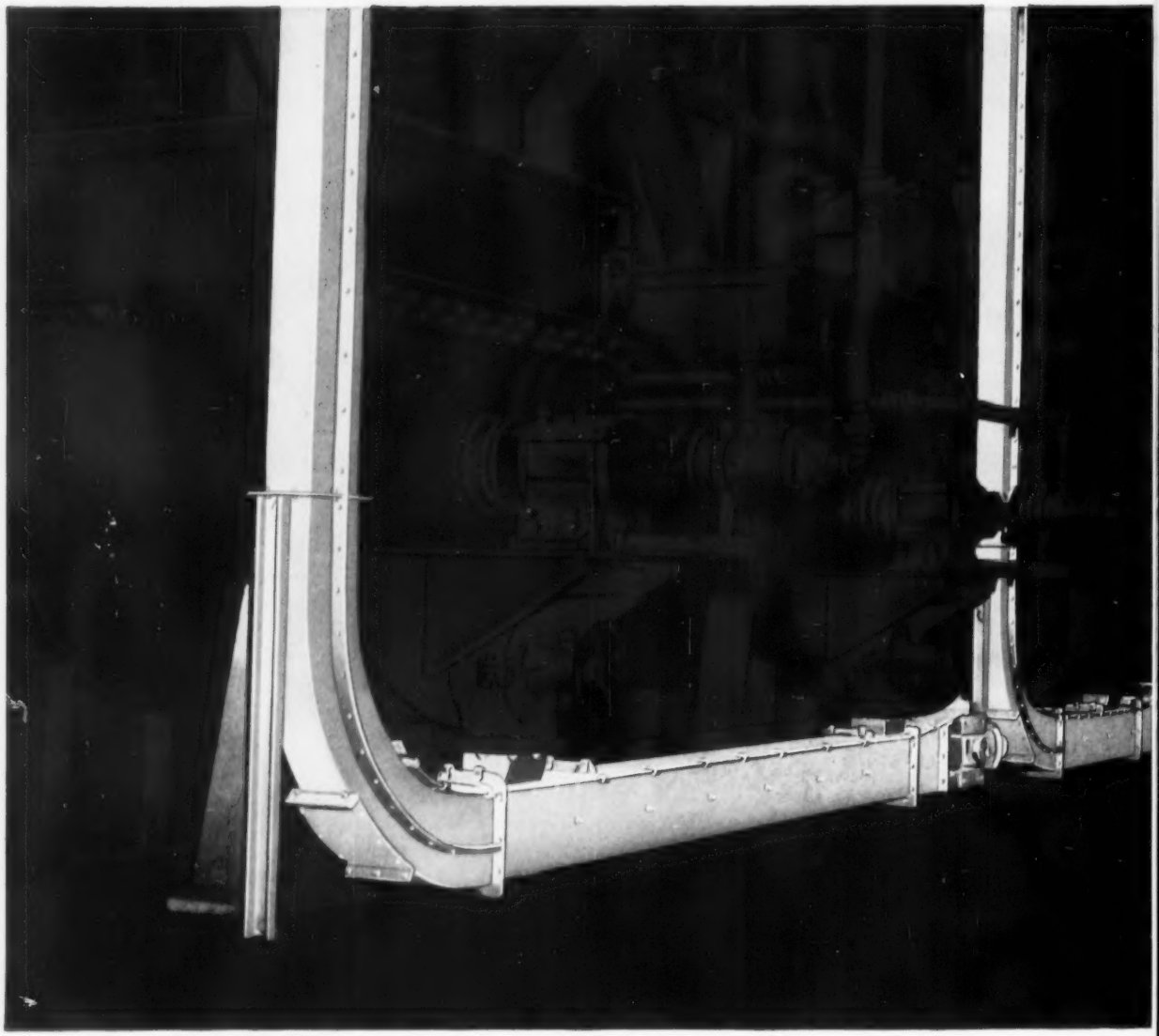
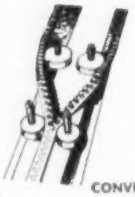


BELT CONVEYORS

VIBRATING CONVEYORS

REDLER
CONVEYORS, ELEVATORS



ZIPPER
CONVEYOR-ELEVATORS

PAN CONVEYORS

BUCKET
ELEVATORS

BIN GATES—
ALL KINDS

← For more data, circle this page number on card at back

-ADAMSON

improve your bulk food conveying systems

Two L-type REDLER conveyor elevators handle powdered dextrine for Penick and Ford, Ltd., Cedar Rapids, Iowa. The REDLER type enclosed conveyor was developed exclusively in the U. S. by STEPHENS-ADAMSON

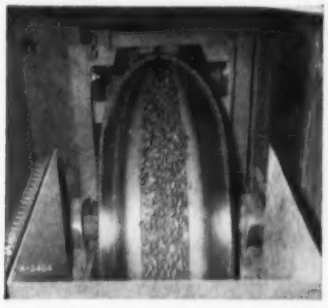
Take a good look at your material handling cost—it's your largest single item of overhead. The straight road to reducing this cost is mechanization on your production line.

The benefits from a scientifically designed bulk materials conveyor system, for example, can be far reaching. They include things like improved product flow, swifter processing, space conservation, elimination of oversize inventories, and improved employee morale.

STEPHENS-ADAMSON can mechanize your food handling procedures by (1) working in close cooperation with your plant engineers, (2) by working independently on both engineering and installation assignments and (3) by drawing from a great variety of standardized conveying products which are manufactured in three strategically located plants.

Call the STEPHENS-ADAMSON district office in your area for a complete analysis of your bulk material handling requirements. When you do you'll take a long step toward lower production cost.

A food slice separating conveyor is used by a midwest processor to move and screen out undersize pickle slices. The installation tremendously speeds up what was once a very time consuming operation, at the same time cutting manpower requirements.



Zipper belt conveyors find many adaptations in the food processing industry. At A. N. Stollwerk, Inc., Camden, N. J., raw cocoa beans are mechanically handled by zipper, insuring clean, dust free transit, eliminating bean breakage and manual handling of heavy bags.

SINCE 1901 S-A STEPHENS-ADAMSON MFG. CO.

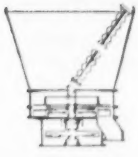
STEPHENS-ADAMSON MFG. CO.

6 RIDGEWAY AVENUE, AURORA, ILLINOIS

LOS ANGELES, CALIFORNIA

BELLEVILLE, ONTARIO

VIBRATING SCREENS



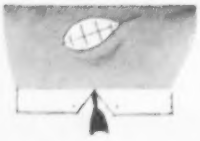
CIRCULAR BIN DISCHARGERS

SEALMASTER BALL BEARING UNITS

S-A manufactures a wide range of material handling products in three complete plants in U. S. and Canada.

- Belt Conveyors
- Belt, Pan & Plate Feeders
- Ship Loading Boom Conveyors
- Stacking Conveyors
- Storage & Reclaiming Systems
- "Natural Frequency" Vibrating Conveyors
- REDLER Conveyor-Elevators
- ZIPPER Conveyor-Elevators
- Conveyor Belt Cleaners
- Headshaft Holdbacks
- Grizzlies & Screens
- Centrifugal Pilers
- Bin Gates & Tunnel Gates
- Car Pullers & Spotters
- Bucket Elevators
- Skip Hoists
- SEALMASTER Ball Bearing Units

• *Write for a bulletin on any of the above products.*



The tale of an embarrassed Manufacturer

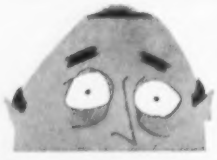
He shaved a tenth of a cent from his production cost. He did it by using an inferior flavor. He couldn't quite understand why his sales were so low...his profit so small ...his embarrassment so financial.

The moral is plain to see. Quality builds consumer acceptance...greater sales... more profit. Realize this goal with P & S flavors. Write for free samples.

POLAK & SCHWARZ, INC.

667 WASHINGTON ST., NEW YORK 14, N.Y.

Offices: Chicago, Ill.; Los Angeles, Calif.; Toronto, Can.; Plants: Teterboro & Guttenberg, N. J.; Culver City, Calif.; New York, N.Y.



Original designs in choice of materials, precision built for every spraying need. Wide range of capacities for all standard operations . . . and for such special requirements as high atomization or abrasive solutions.

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PLANT ENGINEERING

Drainage Traps

Lists specifications for polyethylene waste and drainage system fittings. Has instructions for making fused joints. Bulletin 1, 4p.—*Nalge Co., Inc., Rochester, N. Y. (200A)*

Air Cooled Compressors

Describes and pictures line of compressor outfits with a table of specifications for each unit. Bulletin AC-15, 16p.—*Gardner-Denver Co., Teterboro, N. J. (200B)*

Vertical Pump Line

Contains sectional views, material specifications, schematic application drawings, and photos of installations of vertical close-coupled industrial pumps. Has technical data tables. Bulletin 1100, 12p.—*Layne & Bowler Pump Co., Los Angeles. (200C)*

Cooling Tower

Contents include general features, optional accessories, recommended specifications and typical installations of a line of air conditioning and industrial service cooling towers. Also has mechanical components, typical cross section, engineering data, and tower dimensions and general arrangement. Bulletin 5.1.902 REV. 4, 16p.—*J. F. Pritchard & Co., Kansas City, Mo. (200D)*

Ammonia Return System

Contains data for safe operation of ammonia refrigeration compressors. Describes arrangements of automatically-operated traps and valves for refrigeration return liquid. Bulletin LRS-56, 8p.—*H. A. Phillips & Co., Chicago. (200E)*

Polyethylene Floats

Describes small plastic units designed for retarding evaporation. Floating on top of solutions, they may also eliminate frequent tank cover handling during processing. 2p.—*American Agile Corp., Maple Heights, Ohio (200F)*

General Service Pumps

Has sectional views, parts list, and engineering data for line of general service close coupled centrifugal pumps. Circular No. 191, 4p.—*Dean Bros. Pumps, Inc., Indianapolis (200G)*

Expanded Metal Mesh

Shows styles and sizes of expanded metal mesh, and has applications pictured. Bulletin DM-101, 4p.—*Designers Metal Corp., Harvey, Ill. (200H)*

Non-Metallic Pipe

Discusses pipe and tubing made from thermosetting reinforced epoxy resins. Listings include complete line of fittings. 4p.—*Fibercast Corp., Sand Springs, Oklahoma. (200I)*

Concrete Surface Coating

Full color bulletin describes colored cementatious material in powder form for hardening and densifying concrete surfaces, applied by the dust coat method when floor slabs are poured. Also used as joint filler in brick, tile and glass block. 8p.—*Upco Co., Cleveland. (200J)*

Automatic Adjusting Ramp

Has drawings and specifications for ramps accommodating 20,000 lb., having 30 in. lip travel, floating action, safety lock, and electric or air-oil power. Form 405, 6p.—*Globe Hoist Co., Philadelphia. (200K)*

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Automatic Door Equipment

Describes various door models and includes illustrations, drawings, and suggested specifications. Also has data on cold storage doors. 12p.—*Clark Door Co. Inc., Newark, N. J. (200L)*

Group Relamping Kits

Contains information and materials for estimating savings derived from group relamping. 39p. —*Inquire at local General Electric Large Lamp Sales Office.*

Surface Protectors

Explains how to eliminate concrete dust, restore roofs, and prevent water-seepage in basements

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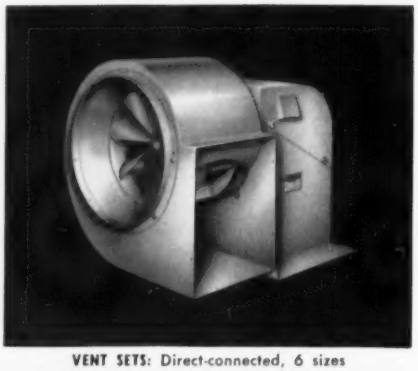

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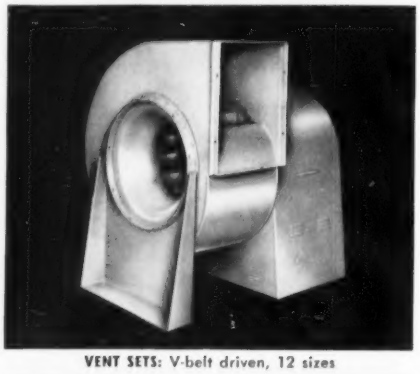

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with specialized materials. MP/50, MP/240, 12p.—*Stonhard Co. Inc., Philadelphia. (200M)*

Steam Coils

Details construction of coils, including tubing, casings, headers, refrigerant distribution, return bends, and valves. Tables are devoted to dimensional data, male pipe connections, and air friction through coils. Bulletin S-200, 4p. —*Halstead & Mitchell, Pittsburgh, Pa. (203A)*

Anti-Skid Grating

Illustrates construction of grating available in variety of designs and materials. Applications and data tables are included. 10p.—*Globe Co., Chicago. (203B)*

Water-Waste Treatment

Contents include meters, feeders, process equipment, material handling, controls, filters, and accessories for water, sewage, and waste treatment systems. Bulletin B-I-F-6, 44p.—*B-I-F Industries, Inc., Providence, R. I. (203C)*

Underground Piping Conduit

Shows construction and application of underground piping conduit including supports, guides, strength tests, design suggestions, installation. Bulletin 9156, 12p.—*Porter-Hayden Co., Newark, N. J. (203D)*

Glass Fiber Insulations

Describes materials, applications, and accessories, of insulations designed for ducts, acoustical absorption steel frame buildings, and other applications. 34 p.—*Gustin-Bacon Mfg. Co., Kansas City, Mo. (203E)*

Air Compressors

Covers a line of air compressors with photos, specification tables and description of each unit. Installation and selection data are included. 18p.—*American Brake Shoe Co., Rochester, N. Y. (203F)*

MATERIALS HANDLING

Oscillating Conveyors

Contains capacity selection chart together with engineering data and diagrams for oscillating conveyor line. Material is moved by means of a constant-stroke eccentric drive that produces an upward and forward oscillating movement. Book 2644, 8p.—*Link Belt Co., Chicago. (203G)*

Portable Elevating Trucks

Treats of fork and platform elevating trucks, drum stackers, and straddle models. Maximum loads range from 1,000 lb. for peddle-operated models to 1500 lb. for battery-powered type. Catalog HE-56, 8 p.—*American Pulley Co., Philadelphia. (203H)*

Scale Line

Covers complete listing including counter, postal, spring, dial, overhead track, industrial built-in sacking, hopper, and tank scales. Form 11-A, 28p.—*Howe Scale Co., Rutland, Vt. (203I)*

Hoists and Trolleys

Full color catalog has photos, drawings, descriptions and data covering many types of hoists, winches, trolleys, and accessories. Construction of each item is described, part by part. Bulletin 1372B, 46p.—*Yale & Towne Mfg. Co., Philadelphia. (203J)*

Electric Fork Trucks

Treats of fork trucks specifically designed for use where low headroom is a problem. Features low operator seat. Bulletin F-48T3, 4p.—*Elwell-Parker Electric Co., Cleveland. (203K)*

Four-Wheel Trucks

Comprises sheets describing magnesium trucks including towveyor units, trailers, shelf trucks, box trucks, and others. 10p.—*Magline, Inc., Pinconning, Mich. (203L)*

Bushed Roller Chains

Contains application photos and complete listing of roller chains manufactured in two designs—straight or offset side bars. Both types operate on standard wheels and a variety of attachments are available. Book 2454, 16p.—*Link-Belt Co., Chicago. (203M)*

Portable Warehouse

Photos show use of inflatable warehouse. Sizes up to 90 x 200 ft. are available. 4p.—*U. S. Rubber Co., Mishawaka, Ind. (203N)*

Slider Board Conveyors

Announces a line of slider board belt conveyors, providing travel up to 300 ft. with a minimum of friction. Handles fragile material, such as cornflakes, gently. Bulletin 175, 4p.—*Sprout, Waldron & Co., Muncy, Pa. (203O)*

Side Shifter

Announces side shifter available for complete line of stand-up and sit-down industrial trucks. Triple-acting hydraulic cylinder provides 4-in. travel on either side of center. *Form SF5-56, 2p. —Lamson Mobilift Corp., Syracuse, N. Y. (203P)*

Load Grabber

Diagrams unit for grabbing pal-

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This unique machine was especially designed to separate not only pickle ends and seeds from the slices, but for similar separating service on any sliced food product.

The sliced product is fed directly from the slicer onto a vibrating screen deck. Due to the vibration, introduced by an eccentric drive, the slices move along the screen deck with undersize and broken pieces falling through to a flat bottom trough. Slices of proper size move along on the screen deck and discharge to the production line. Material falling through the screen deck is conveyed along the trough and falls to a removable container for disposal.

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letless load. The hydraulically-actuated clamp attachments for lift trucks have capacities ranging to 8,000 lb. 12p.—*Cascade Mfg. Co., Portland, Ore. (203Q)*

Bagging Scale

Covers construction, operating rates, and economy features of a multi-purpose bagging scale. Scale accuracy of within 1 or 2 oz. and bagging rates up to 15 bags per min. can be had with the unit. Weigher has power belt feeder, hopper door flapper, leak proof inlet chute, 5-digit counter, and is designed for non-dusty materials. Bulletin 0256, 6p.—*Richardson Scale Co., Clifton, N. J. (204A)*

Gravity Conveyor

Shows a full line of gravity-roller and skate-track conveyors with all pertinent accessories, such as curves, switches, and standards. *Bulletin 801, 8p.—Oliver Corp., A. B. Farquhar Div., York, Pa. (204B)*

Adjustable Conveyor

Illustrates pertinent operating features of portable, rubber belt conveyor that can be tilted up to 30 deg. for case elevating duty. Unit is electric powered and available in lengths to 19 ft., with an extra feeder belt if desired. *Bulletin 50A, 4p.—E. W. Buschman Co., Inc., Cincinnati (204C)*

PROCESSING

Cheese Vats

Details construction of cheese-making equipment and lists specifications of standard size cottage cheese vats. No. 1700, 6p.—*Stoelting Bros. Co., Kiel, Wis. (204D)*

Double Cone Blender

Principles of operation of double cone blender are described. Also has engineering specifications. 8p.—*Paul O. Abbe, Inc., Little Falls, N. J. (204E)*

Centrifugal Unit

Full-color presentation describes line of centrifugal units. Drawings and tables with specifications are included as well as description of all components. Can be made of steel, stainless, monel, rubber-covered steel, or other materials. 22p.—*Fletcher Works, Inc., Philadelphia. (204F)*

Ice-Bar Machine

Drawings in color describe operation of unit that makes 600-dozen ice bars per hour. One- or two-flavored novelties, singles or twins, and chocolate-coated ice cream bars may be produced. 6p.—*Anderson Bros. Mfg. Co., Rockford, Ill. (204G)*

Liquid Cooler

Explains a liquid cooler employing flooded refrigeration principle, used for handling viscous or slurry-type liquids. Multi-pass units are available in a range up to 100 hp. 4p.—*Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y. (204H)*

Dry Feeder

Describes a self-powered dry feeder operating on the principle of balanced weights. Automatic shut-off is available and rates up to 2,000 lb. per min. can be had. *Publication TP-68-M, 4p.—Wallace & Tiernan Inc., Belleville, N. J. (204I)*

Pressure Filters

Furnishes facts on operating details, filter bed materials, design features, and available accessories for two, vertical pressure-filters. One has a slotted, convex diffuser plate bolted to the bottom head. The other consists of a header system with brass strainer. *Bulletins 6319, 6320, 8p.—Cochrane Corp., Philadelphia (204J)*

Continuous De-Sludger

Reports applications of a continuous de-sludger to wort clarification, fruit and grape juice clarification, and vegetable-oil mills. Full color flow diagrams included. *Bulletin 1979B, 5p.—Cherry-Burrell Corp., Chicago. (204K)*

Shear-Flow Mixers

Illustrates size range, applications, specifications, and other features of shear flow mixers. Form 564, 6p.—*Gabb Special Products, Inc., Windsor Locks, Conn. (204L)*

Hop Shredders

Describes construction and operation of crushing units said to reduce spent hops to about 1/10 original size. Bulletin 157, 4p.—*American Pulverizer Co., St. Louis, Mo. (204M)*

Pork Processing Equipment

Catalogs complete line of pork cutting and curing equipment. Has installation photos, layout drawings, and complete index. Catalog 61-A, 28p.—*Allbright-Nell Co., Chicago. (204N)*

Hammermill

Outlines installation arrangement and details construction of hammermill. Also describes conventional products-collecting sys-

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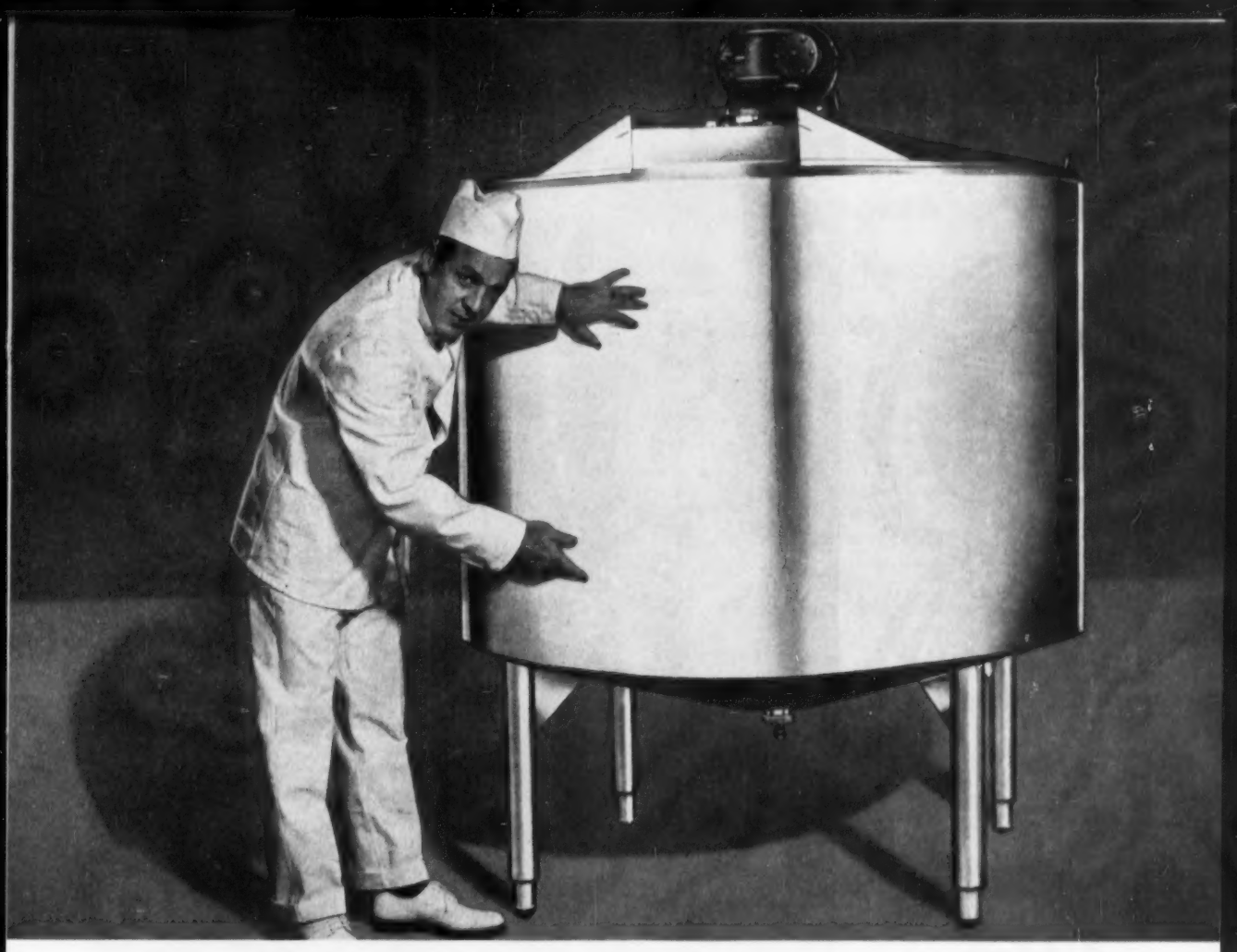

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Put a new Cherry-Burrell Cone Bottom Processor in your plant—and you never have to transfer product from heating to cooling kettles. This multi-purpose, heavy-duty vat does *both*.

Stainless steel pressure channels on vat walls and bottom assure efficient hot water zone heating to 190° F., steam heating to atmospheric boiling temperatures; pre-cooling with city, well or tower water; final low temperature cooling with chilled water. Sizes: 300, 500, 600 and 800 gallons.

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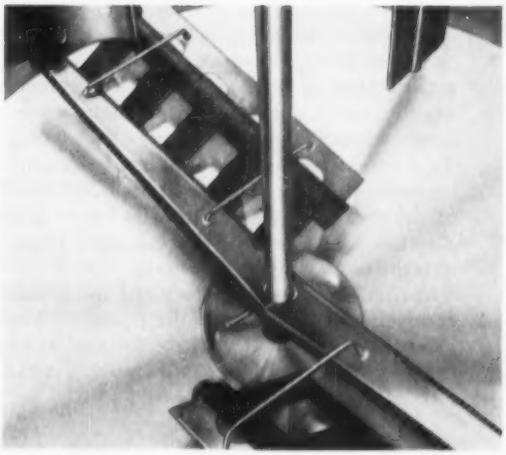

Scraper Blade Agitator for heating, ingredient blending and cooling. Hard plastic blades on all-welded stainless steel frame scrape sidewalls and cone, move product toward center of vat. Blades slide off easily for cleaning purposes.

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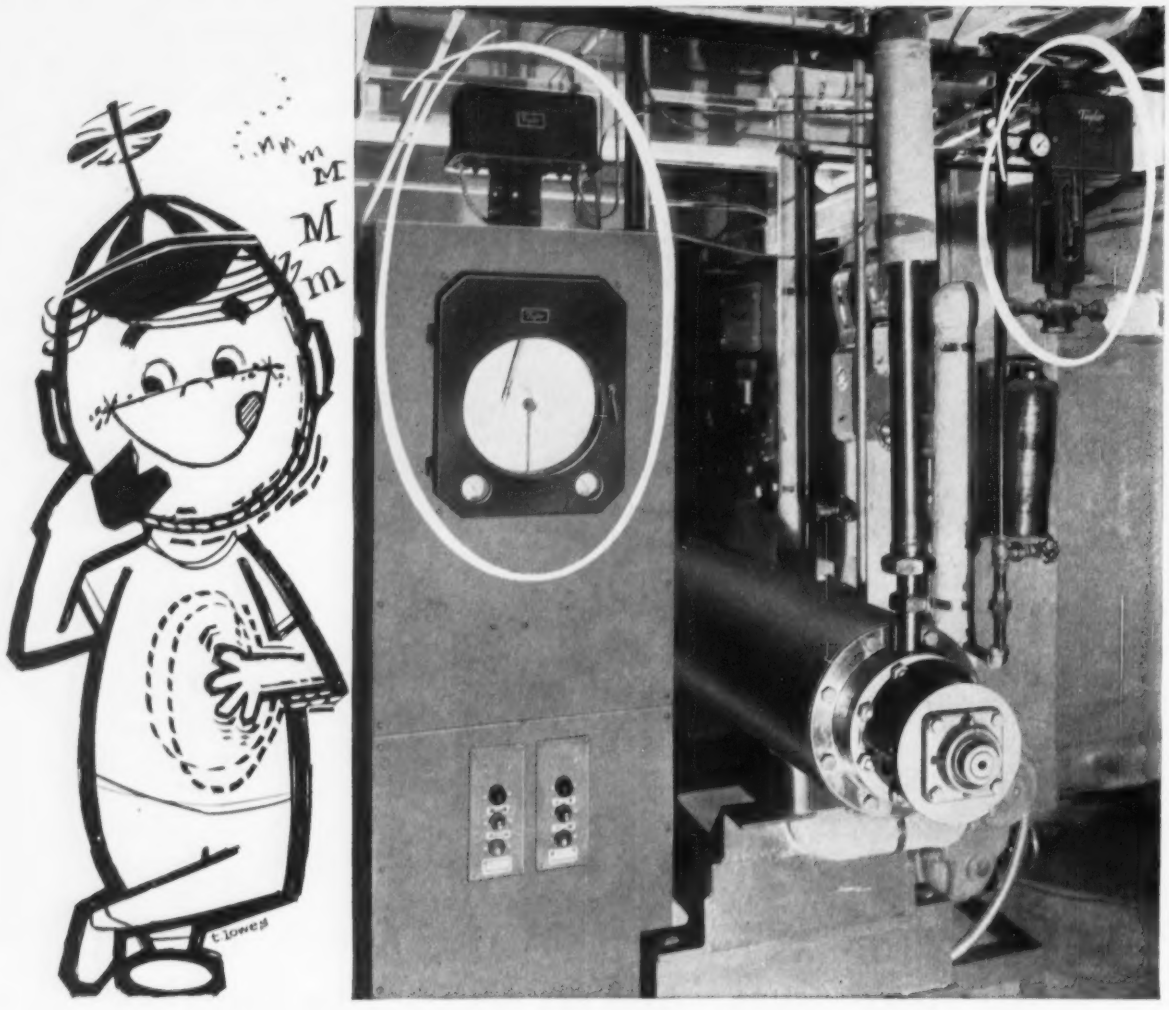

Good Temper of Klein Chocolates assured by Taylor Controlled Votator Chillers!

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Taylor instruments were selected because chocolate tempering requires precise control. Shown above is one of the six VOTATOR chillers in use at Klein's plant. Top left, a TRANSAIRE* Temperature Transmitter signals the exact temperature of the molten chocolate to a TRI-ACT* Controller (*not shown*) and to the recording receiver on the panel. On the right is a MOTOSTEEL* valve which is actuated by the Controller and governs the flow of the coolant to assure the desired temperature of the emitting chocolate.

Klein benefits with:

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tems. Bulletin 1-B, 4p.—*Sprout-Waldron & Co., Muncy, Pa. (204O)*

Brining & Pickling

Lists and abstracts publications dealing with brining and pickling of cucumbers and other vegetables. 18p.—*USDA Food Fermentations Laboratory, Raleigh, N. C. (207A)*

Solids Classifier

Treats solids classification theory, and advantages of a classifier unit. Large picture aids discussion of operation. Standard machines run to 10 tons per hr. capacity. *Bulletin 1280, 10 p.—Sharples Corp., Philadelphia. (207B)*

Pressure Plate Freezers

Considers plate production freezers said to eliminate difficulties of unbalanced loads and uneven schedules. 1p.—*Refrigeration Corporation of America, New York City. (207C)*

Vacuumizer Vat

Depicts vat that forces product to fall through a vacuum in thin streams. Air is introduced to carry volatiles to the atmosphere. 4p.—*Tolan Machy. Co., Inc., Port Newark, N. J. (207D)*

PACKAGING

Hot Melt Adhesives

Covers advantages of hot melt adhesives in coil form. Designed for use with special feeding and melting device for bonding polyethylene films, foils, glassine, and paper. 6p.—*United Shoe Machinery Corp., Boston. (207E)*

Automatic Cartoners

Lists typical products and uses for automatic constant motion cartoners. Units feed and open cartons, insert single or multiple loads, glue or tuck carton flaps. 4p.—*R. A. Jones & Co., Inc., Cincinnati. (207F)*

Case Sealing Unit

Describes machine that seals cases by gluing and taping. Automatic units have controlled glue applications, wide range of carton sizes, quick size adjustment, and are easy to clean. *Bulletin 11, 4p.—Clybourn Machine Corp., Chicago. (207G)*

Vacuum Packaging

Furnishes data on vacuum packaging unit that encloses food between two heat-sealed layers. Up to sixty 6- or 8-oz. packages per minute can be handled. 4p.—*Standard Packaging Corp., New York City. (207H)*

Carton Stapler

Contains specifications for stapler that stitches tops and bottoms of cartons in less than 3 sec. Handles cartons up to 24x36 in. 4p.—*International Staple & Machine Co., Herrin, Ill. (207I)*

Can Coders

Reviews current methods employed in coding cans, and contains a guide and check list that tells how to code essential quality control information on metal cans. 8p.—*Triple-E Engineering Co., Racine, Wis. (207J)*

Bakery Products

Lists types of packaging materials to be used by the baking industry based on method of distribution. Reasons for selecting each material are given. Bulletin 151, 2p.—*American Society of Bakery Engineers, Chicago. (207K)*

Corrugated Boxes

Stresses labor savings obtainable through proper use of corrugated boxes. Specifies suggestions, based on a study of packaging lines. *Bulletin No. 4, 26p.—Hinde & Dauch, Sandusky, Ohio. (207L)*

Plastics in Packaging

Considers uses of plastics in packaging and includes information on adhesives, coatings, and laminations, as well as molded and extruded plastic containers. Aids manufacturer in choosing the proper material. *Bulletin J-658, 8p.—Bakelite Co., New York City. (207M)*

Vacuum Packers

Describes vacuum forming and packaging machines. Unit can accomplish plastic, drape and vacuum forming, contour or skin packaging, and blister and cluster packs. 4p.—*Product Packaging Engineering, Culver City, Calif. (207N)*

Package Caser

Provides photos of applications, floor plan drawing, and list of specifications for a package caser that handles up to 240 packages per min. (frozen foods). *Bulletin CMD 601-W, 4p.—Food Machinery & Chemical Corp., Hoopston, Ill. (207O)*

Printing by Transfer

Presents samples of transfer-printed labels that consist of thin, heat-transferable coatings on a paper base. Using heat and pressure, label design is transferred from paper to packaging material. 4p.—*Dennison Mfg. Co., Framingham, Mass. (207P)*

Can Carton and Packer

Covers six-pack cartons and cartoning machine that handles more than 650 cartons per min. 4p.—*Currie Packaging Co., Charlotte, N. C. (207Q)*

If your product contains fats or oils you should know about Myverol Distilled Monoglycerides

Myverol® Distilled Monoglycerides is our name for our food emulsifiers that consist of practically all monoglyceride and practically no soaps, catalysts, or free fatty acids. "Myverol" is our trademark. "Distilled" means we produce them by molecular distillation, which is what achieves this exceptional purity. The "Monoglyceride" can come from any food fat, cottonseed oil to prime steam lard.

There's no food emulsifier quite like Myverol, nothing that acts quite the same. For example:

IN CAKE MIXES—with *Myverol* you can add the emulsifier separately, use it to compensate for variations in ingredients.

IN PEANUT BUTTER—you can use *Myverol* as a stabilizer to protect against "oil-out," to give a smoother-spreading product with less stickiness to tongue and palate.

IN HOUSEHOLD SHORTENING—very low levels of *Myverol* do a real job. You can use them after deodorization, and they keep the product in good working condition long after it reaches the kitchen cupboard.

IN ICE CREAM—*Myverol Distilled Monoglycerides*, along with an appropriate stabilizer, can be used to control overrun, produce a product with excellent dryness and melt-down.

In other products, too, like baker's shortening, chocolate coatings, and margarine, *Myverol Distilled Monoglycerides* can make a real contribution to product quality. We'll be glad to work it out with you. To get started, write ***Distillation Products Industries,*** Rochester 3, N. Y. Sales offices: New York, Chicago, and Memphis • Gillies Inc., Los Angeles, Portland, and San Francisco • Charles Albert Smith Limited, Montreal and Toronto.

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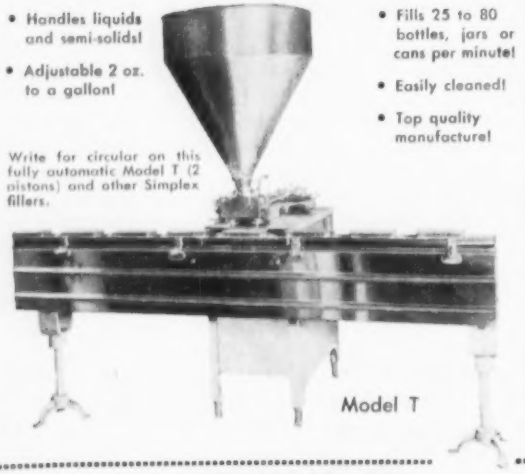

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MAINTENANCE

Paint Record Book

Furnishes forms for recording various painting jobs. Also has technical information on painting. 24p.—*Tropical Paint Co., Cleveland. (208A)*

Abrasives and Wear

Discusses theories of wear, and explains and shows how to eliminate abrasion. Publication No. 2, 12p.—*The Texas Co., New York City. (208B)*

Plug-In Motor Warmer

Describes oil or gas-fired motor heating system. Bulletin 418, 6p. —*Vapor Heating Corp., Chicago. (208C)*

Mechanical Packings

Gives features of a series of braided, twisted, V-ring, and hollow-center packings for rods and shafts. Gasket material listings are included. Each type is pictured, and recommendation charts list suggested applications. *Catalog 56, 22p.—Belmont Packing & Rubber Co., Philadelphia. (208D)*

Cleaning Compounds

Separate catalogs cover products for rest rooms, industrial cleaning, scrubbing, floor finishes, and others. 32p.—*Brulin & Co., Indianapolis, Ind. (208E)*

Small Machine Lubrication

Describes automatic and semi-automatic centralized lubrication systems for a wide range of small machines. Discusses many factors in selecting proper type of lubricator. Bulletin 4B, 24p.—*Bijur Lubrication Corp., Rochelle Park, N. J. (208F)*

Silicone Lubricants

Includes properties and performance of various silicone oils, greases, and compounds. Has typical applications. Code No. 6-101, 8p.—*Dow-Corning Corp., Midland, Mich. (208G)*

Cutting Lubrication

Informs on use of a pressurized lubricator for applying a fine mist of soluble wax or oil to tool surfaces during cutting and machining operations. Unit operates on 25 to 150 lb. air pressure. *Bulletin 37, 2p.—Trico Fuse Mfg. Co., Milwaukee. (208H)*

Special Lock Nuts

Gives numerous applications and installation instructions for a special, self-locking nut—available in four models—that stays put at any point on the bolt. 12p.—*Standard Pressed Steel Co., Jenkintown, Pa. (208I)*

INGREDIENTS

Flavor Catalog

New listing of flavors, colors, soft bases, and concentrates gives prices and suggested uses for food manufacturers. 28p.—*Florasynth Laboratories, Inc., New York City. (208J)*

Cheese Enzyme

Concerns use of a lipase enzyme preparation for manufacture of foreign-type cheeses. The edible compound is available in two types. 2p. — *Dairyland Food Laboratories, Inc., Waukesha, Wis. (208K)*

Starch Use Formulas

Contains information on use of potato and arrowroot starches and has recipes for their use in pudding and icing. 2p.—*Morningstar, Nicol, Inc., New York City. (208L)*

MSG Reference Book

Answers questions on use of MSG in food processing, including quantities to use in various foods, types of food to use it in. 13p.—*Glutamate Manufacturers Technical Committee, San Francisco. (208M)*

Pie Recipes

Includes recipes for 34 fruit-pie fillings. Contains information on the quantity of starch to be used, describes correct methods of handling frozen, canned, fresh and dehydrated fruits, and gives general cooking directions. 52p. —*Corn Products Sales Co., New York City. (208N)*

Dietetic Sweetener

Discusses use of dietetic sweetener from technical and commercial viewpoint. Chemical and medical data are included. 20p. —*Abbott Laboratories, North Chicago, Ill. (208O)*

Peroxygen Compound

Technical bulletin discusses modification of starches, proteins, and gums with peroxygen compounds to give improved properties. Many references are included. Bulletin No. 27, 16p.—*Food Machinery & Chemical Corp., Buffalo, N. Y. (208P)*

Guar Gums

Details properties of pure vegetable colloid used for increasing viscosity. Also includes information on standards concerning Guar

BAKER *offers LP gas fork trucks in 2000 to 7000 lb. capacities*

The complete Baker line includes the BAKER LP gas fork trucks for those desiring the cost savings, cleaner operation, and other advantages provided by liquefied petroleum gas.

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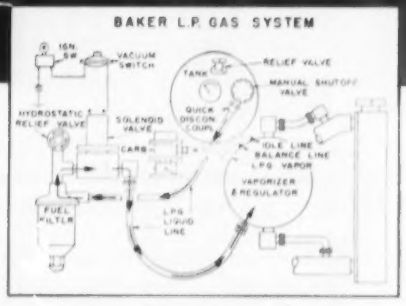

Arrows trace the flow of LP gas from the tank through the filter to the vaporizer and regulator before it enters the engine. The hydrostatic relief valve opens the system before dangerous pressure is reached in event of high ambient temperature changes. Automatic fuel shut-off is provided by solenoid valve and vacuum switches when engine stops. For maximum efficiency, the vaporizer preheats the LP gas before it passes to the regulator and the regulator reduces the pressure before the gas enters the carburetor.

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gum, methods of handling, types available, and applications. 16p.—*Stein Hall & Co., New York City. (208Q)*

Instant Starch

Explains pre-cooked, spray-dried instant starch used for viscosity control and easy reconstitution of mixes. No. 432-56. 4p.—*Corn Products Sales Co., New York City. (211A)*

Anti-Oxidant Curing Aid

Discusses chemistry and properties of meat curing aid anti-oxidant compound. Use in fresh and cured meats is described. 12p. —*Wallerstein Co., New York City. (211B)*

SANITATION

Portable Steam Cleaner

Has details on portable steam cleaner that delivers 400 gph. of cold water at 450 psi. or a mixture of water, steam, and cleaning compound at 325 F. Bulletin 17-A-56, 4p.—*Homestead Valve Mfg. Co., Coraopolis, Pa .(211C)*

Chemical Cleaning Service

Discusses service for cleaning large equipment, with solvents, in a matter of hours. 12p.—*Sunco Engineering Co., Caldwell, N. J. (211D)*

Sugar Tank Sterilizer

Concerns ultra-violet sterile conditioning system designed especially for liquid sugar tanks. 1p.—*D. W. Fuller Co., Chicago. (211E)*

Tomato Mold Counting

Covers all aspects of tomato mold counting with tables, graphs, drawings, colored photos, and microscope magnifications. Contents include significance of mold in tomato products, the Howard Mold count method, characteristics of mold, principal molds in tomato products, factors in packing operations, FD&A announcements, and other pertinent information. 56p. — *Continental Can Co., New York City. (211F)*

Sack Cleaner

Describes steel sack-cleaners that can be located in any corner of a building. Safety cage prevents bags from entering system. *Bulletin 157-A—Sprout-Waldron & Co., Inc., Muncy, Pa. (211G)*

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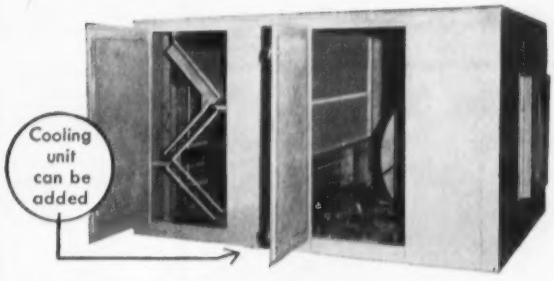

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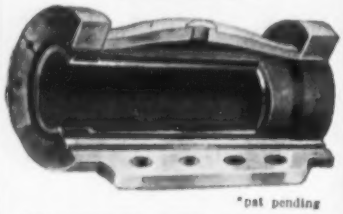

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This pneumatic control valve easily handles flour, cereal, cocoa, sugar, wheat, whey, molasses, dog foods, etc. in liquid or dry granular form.

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- Controlled automatically from time cycle programer or manually on location

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Refresher for Technologists

LABORATORY MANUAL FOR FOOD MICROBIOLOGY. *By W. C. Frazier and E. M. Foster. Published by Burgess Publishing Co., 426 S. Sixth St., Minneapolis 15. 1957. 78 pages. 8½ x 10¾ in., paper (ring-bound). Price: $2.50.*

This revised edition of a popular educational text can serve as an excellent refresher-reference for the food technologist or processor. Written by two bacteriology professors at the University of Wisconsin, book details 49 experiments, supplemented with references.

Five sections made up the work: Microbial Content of Food, Preservation of Food, Spoilage of Foods, Sanitary Inspection and Control, and Food Poisoning and Infections.

An appendix offers starch and sugar standards, data on examination and sampling of foods, and a program for diagnosing spoilage in canned foods.

Processor's Guide to Pumps

PUMP SELECTION AND APPLICATION. *By Tyler G. Hicks. Published by McGraw-Hill Book Co., 330 W. 42nd St., N.Y.C. 36. 1957. 432 pages. 6 x 9¼ in., cloth. Price: $8.50.*

This guide to pumps and their uses is directed at providing processors with a key to more economical and efficient installation and operation. Discussion ranges from descriptions of the basic pump styles to the pumping problems peculiar to certain industries—including food processing.

Booklets & Reports

DETERMINATION OF MOISTURE IN SOLIDS. *Published by British Scientific Instrument Research Association, Southill, Elmstead Woods, Chislehurst, Kent, Great Britain. 51 pages, paper. Price: about $1.45.* Brief descriptions of over 40 techniques. Bibliography included.

STRENGTHENING SUPERVISORY AND EXECUTIVE PERFORMANCE *(No. 167 in Personnel Series). Published by American Management Assn., New York City 36. 63 pages, paper. Price: $1.75 ($1 to members).* Selection and training of management personnel.

FE REPRINTS AVAILABLE

Listed below are special sections, flowsheet book, and articles from past issues of FOOD ENGINEERING which are available in reprint form. Single-copy prices are listed. For orders of 20 or more, there is a 25% discount. To order reprints, use coupon at bottom of page. You will be billed when your order is filled.

1. Sensory Panel Testing . . . . . $.75

Article details the six important steps necessary in establishing a true evaluation through sensory panel testing. Included are samples of forms and probability tables.

2. Suggestion System . . . . . $.40

Comprehensive analysis of how one company—National Biscuit—has gained dividends with an effective suggestion system. Article covers problems of instituting such a system, and discusses some sure-fire solutions. Reproduced are posters, forms, and charts in the Nabisco campaign.

3. Work Simplification . . . . . $.40

Planning an "efficiency program" to cut waste and sharpen production procedures? Then read this study of how Carnation Co.'s three-step method made work simplification pay off—and boosted employee morale, too.

4. Goes All Out for Progress . . . . $.75

The story behind the construction of H. W. Lay Co.'s $1,800,000 Atlanta plant—a facility that stands as a model for food processors planning expansion or improvement of their plants. Careful planning and skillful engineering are shown at their best in this documented case history of the development of a huge plant from drawing board to production.

5. Progress in Flexibles . . . . . $.50

Five information-packed sections comprise this authoritative special report: Developments Set Fast Pace; They're Making Better Flexibles; New Packages Appeal, Simplify; Things You Should Check; 158 Suppliers of Flexibles. Comprehensive coverage of flexible packaging advances and practices.

6. Freezers . . . . . $.50

Months of preparation went into this 16-page special report presenting up-to-the-minute engineering facts on today's new and faster freezing units. Five illustrated sections cover continuous plate, blast, direct immersion, and continuous liquid freezers, also plate, tray, and room units. Included is a list of manufacturers.

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RECENT INVENTIONS

PRODUCTS

Chewing Gum Comprising Gum Base, Flavoring, Adhesion-Reducing Silicone—M. C. Leonard, Nashville, Tenn. No. 2,761,782. Sept. 4, 1956.

Vitamin B-12 Concentrate From Propionibacterium Fermentation Liquors by Separating Cells, Washing, Adding Acetone, Filtering—A. Leviton, Washington, D. C. to USA. No. 2,764,521. Sept. 25, 1956.

Caramel Color by Acidifying Corn Syrup, Heating, Treating with Ammonia, Cooling—W. R. Fetzer, Clinton, Iowa to Standard Brands, Inc., New York City. No. 2,767,108. Oct. 16, 1956.

Link-Sausage Having Tubular Casing Stuffed With Sausage, Tie-Strings, Protective Coating —R. H. Schneider, Bridgeport, Conn. No. 2,767,097. Oct. 16, 1956.

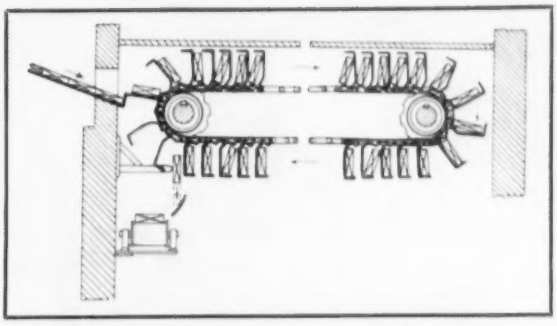
Cashew-Nut Shell and Resinous Material Molding Compound—M. C. Harvey, S. Orange, N. J. to Harvel Corp. No. 2,767,150. Oct. 16, 1956.

Frozen Confection by Forming Mix, Standardizing Acidity, Adding Calcium Sulphate, Freezing While Whipping—E. D. Fear to DeRaef Corp., Kansas City, Mo. No. 2,767,098. Oct. 16, 1956.

Potato Products Sliced with Alternating Faced Ridges and Grooves—B. Stahmer, Omaha, Neb. No. 2,769,714-5. Nov. 6, 1956.

Cereal Food Comprising Blend of Grain, Oil Seed, to Impart Oil Content of 3 to 6% by Mixing at 3,000 psi. and 250 —F. M. Albert, Galesburg, Ill. No. 2,774,670. Dec. 18, 1956.

Want more information on any of these recent patents—if so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.



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EQUIPMENT

Sausage Casing and Tying Unit Adapted to Feed Casings to Tying Station—S. E. Bengston, Lidingo, Sweden. No. 2,760,226. August 28, 1956.

Slaughtering Device Having Animal Pen, Light for Blinding Animals—H. P. Watson to Streitz Packing Co., Inc., St. Joseph, Mo. No. 2,766,476. Oct. 16, 1956.

Frozen-Confection Unit Including Rotatable Trough-Shaped Housings, Mould Plate, Rolls, Baffles, Cooling Supply, Warming Agent Supply—M.

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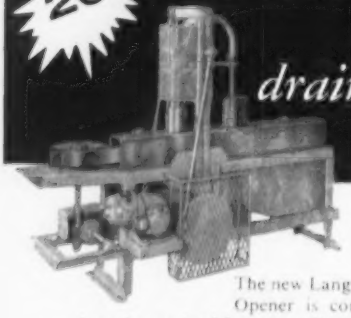

The new Langsenkamp "101" Can Opener is completely automatic . . . does the work of four men. Depending on the product's consistency, it can open, drain and rinse up to 20 No. 10's a minute. Positively eliminates the chance of can slivers getting into your product.

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M. Baker, West Heidelberg, Victoria, Australia. No. 2,766,596. Oct. 16, 1956.

Brine-Injecting Apparatus for Meat Comprising Pressure Vessel, Conduit, Valves, Volume Measuring Means, Pipes, Nozzles—W. Unger, Ansbach, Mittelfranken, Germany. No. 2,766,679. Oct. 16, 1956.

Egg-Handler Having Supports, Sleeves, Suction Cups—R. E. Draper, Albion, N. Y. No. 2,766,879. Oct. 16, 1956.

Poultry-Dressing Unit Comprising Cutter, Sheath, Conveyor, Guide—J. H. Dahlberg to V. A. Swanson & Sons, Omaha, Neb. No. 2,766,477. Oct. 16, 1956.

Doughnut-Cooking Machine Combining Basin, Discharge Conveyor, Fat Circulation Means, Doughnut Inverter, Discharge—D. C. Ackles, Los Angeles. No. 2,767,641. Oct. 23, 1956.

Sausage-Loaf Mold Including Horizontal Support Plate, Upright Mounting Plate, Horizontal Ejector Pins, Mold Box With Apertures Registerable With Pins—F. Turchan, Dearborn, Mich. No. 2,767,642. Oct. 23, 1956.

Cider Mill Comprising Frame, Hopper, Crushing Roll, Grinding Roll—W. W. Gates, Chico, Calif.—No. 2,767,643. Oct. 23, 1956.

Fruit-Juice Extractor Having Housing, Halved Citrus Fruit Moving Means, Cutting Blades, Juice Expressing Means—F. W. Bireley, N. Hollywood, Calif. No. 2,767,645. Oct. 23, 1956.

Frigid Confection Units Utilizing Upper and Lower Shaft Members, Forming Dies, Coupling Means, Forming Die Lowering Means—W. Sedutto, New York City. No. 2,767,664. Oct. 23, 1956.

Candy Machine Having Endless Conveyor, Candy Rope Former, Drive Maintaining Candy Rope Under Tension, Cutting Blades—N. F. Bestoso, Tacoma, Wash. No. 2,767,665. Oct. 23, 1956.

Corn-Cutting Machine Comprising Peripheral Cutter, Corn Ear Guide, Feed, Means to Stop Operation Upon Clogging of Cutter—R. Cover, Westminster, Md. No. 2,767,716. Oct. 23, 1956.

Milk Tank Having Outer and Inner Shells, Vacuum Chamber—L. A. Blackburn, Huntington Park, Calif. No. 2,767,962. Oct. 23, 1956.

Dough Device for Measuring Percentage of Free Gas, Having Sample Compressing Means, Volume Reduction Measuring Means—J. C. Baker, Hewitt to Baker Process Co., Belleville, N. J. No. 2,768,523. Oct. 30, 1956.

Meat-Slicing Machine Using Hydraulic Feed Means, Flow Control Valve, Vertical Member Moved in Accordance With Thickness of Meat—O. Garapolo and J. V. Dornan to Wilson & Co., Chicago No. 2,768,666. Oct. 30, 1956.

Cyclone Concentrator Comprising Frustroconical Casing Having Tangential Inlets and Axial Outlet, Spiral Baffles—F. E. Albertson, Nicaro, Oriente, Cuba. No. 2,768,745. Oct. 30, 1956.

Grain-Dryer and Conveyor Having Frame, Supports, Circular Fan, Dryer Chamber, Grain Intake and Discharge Tubes, Hot Air Means—L. E. Kechely, Phillipsburg and W. R. Brandon, Republican City, Neb. No. 2,769,245. Nov. 6, 1956.

Pretzel-Forming Machine Combining Elongated Dough Stick Delivering Device, Transferring Means, Drive Means, Throw-out Clutch—H. G. Allen, Niagara Falls and O. M. Hudson, Kenmore, N. Y. to American Machine & Foundry Co. No. 2,769,407. Nov. 6, 1956.

Candy Dispositing Pump Having Housing, Cylinders, Pistons, Cut-Off Bar Between Cylinder Discharge and Outlet Nozzle—G. F. Perkins to National Equipment Corp., New York City. No. 2,771,225. Nov. 20, 1956.

PROCESSES

Extracting Oil and Protein From Oleaginous Materials by Comminuting, Grinding in Alkaline Solution, Lowering pH, Heating, Separating, Acidifying—N. Sugarman, to Georgia Tech Research Institute, Atlanta, Ga. No. 2,762,820. Sept. 11, 1956.

Sterilizing Cream-Style Canned Corn by Heating Stratified Product, Agitating—C. O. Ball,

WASHDOWN HOSE

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For washing, cleaning and sterilizing equipment, this specially compounded **U. S. RAINBOW® CREAMERY HOSE (STYLE P-255)** has a white, strong and flexible cover, resistant to destructive effects of grease and lactic acid. Nozzle can be built integral to prevent chipping of fragile linings in tanks and sterilizers.

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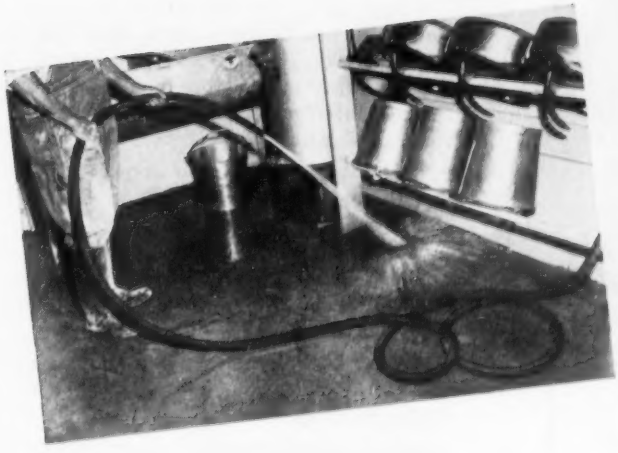
FOR COLD OR WARM WATER



U. S. PEERLESS® WATER HOSE (STYLE P-365) has a tube of extruded natural rubber to provide a smooth waterway. Carcass of braided rayon for longer life in high-pressure service. Highest grade brown cover is specially compounded for resilience, resistance to abrasion and other abuse. Particularly good for fruit and vegetable processing plants.

This attractively priced hose, **U. S. RAINBOW WATER HOSE (STYLE P-340)**, has a carcass of exceptional strength and flexibility, thanks to two braids of high-twist cabled rayon. Tough rubber cover resists abrasion from dragging or scuffing. Seamless tube of special rubber stock.

"U. S." Hose is available at any of the 28 "U.S." District Sales Offices, at selected distributors, or write us at Rockefeller Center, New York 20, N. Y.

Mechanical Goods Division

United States Rubber

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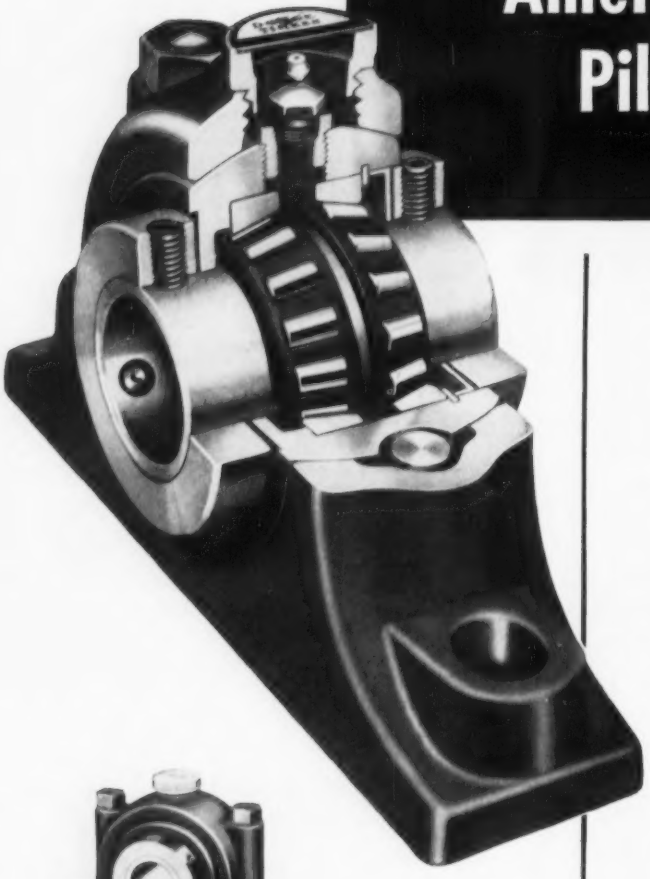
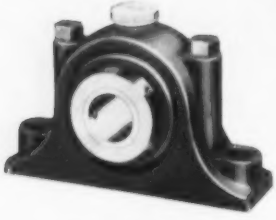
AVAILABLE IN FIVE TYPES
FOR ALL KINDS OF SERVICE

DODGE-TIMKEN
America's Quality Pillow Block





- COMPLETELY ASSEMBLED
- FACTORY ADJUSTED
- PRE-LUBRICATED

Call the Transmissioneer, your local Dodge Distributor. Factory-trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

DODGE manufacturing is adjusted, lubricated and sealed at the factory. Labrynth seals effectively retain the lubricant and prevent the entrance of dust and dirt. The inbuilt precision of Dodge-Timken Bearings is protected both on and off the shaft. They are delivered fully assembled, ready to mount.

Where service conditions are toughest Dodge-Timken Bearings prove their quality decisively. For superior performance, dependability and long life they have won their reputation throughout industry as America's quality pillow blocks.

To meet varying service requirements Dodge-Timken Pillow Blocks are available in five types—the type E . . Double Interlock (illustrated) . . Type C . . Special Duty . . . and All-Steel. Available in a range of shaft sizes from 1-3/16" to 10".

Call your Transmissioneer; or write for Bulletin A638 giving load ratings, dimensions and other data on Dodge-Timken Roller Bearings.

DODGE MANUFACTURING CORPORATION
2800 Union Street, Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

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New Brunswick, N. J. to United Products Co., Westminister, Md. No. 2,767,101. Oct. 16, 1956.

Treating Non-Crystallizing Starch Hydrolysate With Heat and Acid to Lower Specific Rotation at Least 5 deg.—W. R. Fetzer, Clinton, Iowa to Standard Brands, Inc., New York City. No. 2,767,109. Oct. 16, 1956.

Preparing Food Animals by Bleeding, Removing Viscera, Blocking Arteries, Introducing Edible Fat Into Arteries—O. E. Schotte, Amherst, Mass. to Amherst College. No. 2,767,096. Oct. 16, 1956.

Baking in Baker's Oven by Applying Steam Before Baking —W. W. Spooner to Spooner Food Machy. Engineering Co. Ltd., Ilkley, England. No. 2,767,667-8. Oct. 23, 1956.

Cheddaring Cheese by Forming Concavity Across Bottom and Convex Configuration Across Top of Cake, Gradually Applying Pressure—B. T. Hensgen to Swift & Co., Chicago. No. 2,768,083. Oct. 23, 1956.

Processing Cheese and Packaging System Having Ground Cheese Inlets, Process Cheese Outlets, Cheese Mixing and Conveying Rotor, Sheeting Means, Cheese Elevator, Hopper, Heat Sealing and Sterilizing Means—L. Drangle, Gilman, Wis. No. 2,768,572. Oct. 30, 1956.

Producing Hopped Brewers Worts Continuously by Removing Sweet Worts from Mashed Tun, Passing to Hop Extraction Stage, Raising Temperature, Subjecting Hopped Worts to Sedimentation and Cooling During Discharge—S. W. G. Paine, Addiscombe, England to APV Co. Ltd., London, England. No. 2,768,897. Oct. 30, 1956.

Preparing Dried Segmented Apples and Pears by Storing to Maturity, Peeling, Coring, Halving, Inspecting, Washing, Cutting into Squares, Spraying with Sodium Sulphate, Drying, Storing, Screening, Water Spraying, Packing—R. B. Vertner to Ross Packing Co., Selah, Wash. No. 2,768,900. Oct. 30, 1956.

Separating Lactose from Whey by Evaporating, Crystallizing, Continuously Feeding into Screen Reel—D. D. Peebles, Davis and T. D. Clary, Jr., Petaluma to Western Condensing Co., San Francisco, Calif. No. 2,768,912. Oct. 30.

Treating Coffee-Roaster Exhaust Gas for Removal of Combustible Constituents by Centrifugally Separating Entrained Solid Particles, Burning Combustibles in Gas Streams—E. M. Miller to Cook Coffee Co., Euclid, Ohio. No. 2,769,504. Nov. 6, 1956.

Preparing Ground-Meat Into an Adhesive Strip Including the Steps of Grinding Lean Beef and Connective Tissues, Chilling, Regrinding, Compressing—H. B. Shadid, Oklahoma City, Okla. No. 2,771,366. Nov. 20, 1956.

PACKAGING

Handles for Milk Cartons Comprising Vertical Grip, Carton-Engaging Element—F. D. Young and T. W. Munger, Lafayette, Ind. No. 2,763,414. Sept. 18, 1956.

Liquid-Filling Machines Having Trapeze Mounted Scoops, Container Chute, Sealing Mechanism, No-Container, No-Fill Means—R. H. Carson, Sr. and E. O. McCartney, Tampa, Fla. No. 2,763,417. Sept. 18, 1956.

Can-Filler for Spaghetti Type of Food Having Hopper, Tube, Measuring, Cut-off, and Discharge Unit—R. L. Hill to Morgan Packing Co., Inc., Austin, Ind. No. 2,763,418. Sept. 18, 1956.

Sealing Containers by Pressing Cap over Mouths, Indenting—F. E. Young to Thomas Hunter Ltd., Rugby, England. No. 2,765,600. Oct. 9, 1956.

Can-Handle and Punch Comprising Ear-Shaped Strip of Resilient Material Having Cutting Point—C. B. Kohnen, St. Louis. No. 2,765,530. Oct. 9, 1956.

Applying Adhesives to Box Corners, Folding Flaps and Corners—H. F. Wischusen, Melrose to Post Machinery Co., Beverly, Mass. No. 2,765,714. Oct. 9, 1956.

Can Wrapping by Placing Wrapper Over Supporting Plates, Rolling Cans Into Layers, Lowering Plate, Folding Wrapper—S. R. Johnson, River Forest, Ill. to Continental Can Co., Inc., New

Staley's H.V.P.* works 4 ways to improve your food products

*HYDROLYZED VEGETABLE PROTEIN

From soups to hash, baked beans to sausages—whatever your product—you'll enjoy greater repeat sales when you add Staley's H.V.P. to your recipes. And here's why:

(1) Staley's *new* H.V.P. *adds* natural meat-like flavor. (2) It enhances taste appeal in a wide variety of foods. (3) It gives you greater flavor solids concentration. (4) It assures a uniform, better balanced flavor of your products.

Staley's H.V.P. is made by an exclusive, new process to give you liquid Hydrolyzed Vegetable Protein with improved flavor, a rich, golden-brown color—at lower cost.

For complete technical application data, write:

A. E. STALEY MFG. CO., Decatur, Illinois

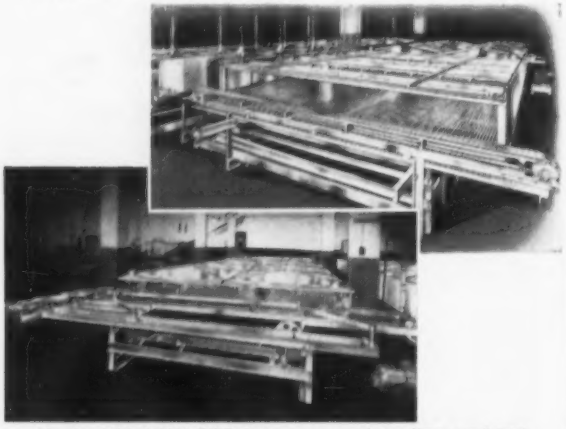
The CAMCO "WALKING BEAM" UNIT

FOR FOOD PROCESSING

Pasteur, high speed, fully automatic cooking, pasteurization, exhausting, cooling, freezing and drying of containers for fruits, vegetables, jams, jellies, preserves, pickles, juices, nectars and other products.
High speed, *automatic handling* of all sizes and shapes of containers, whether tin or glass is guaranteed by *CAMCO-UNIT* Design. The even, uniform surface of the *CAMCO UNIT "Walking Beam Deck"*, assures gentle positive handling of all containers.

• CAMCO . . . the most sanitary, labor saving food plant equipment available today.

Inquiries Invited . . .



The thoughtful *CAMCO-UNIT* design assures *precise, uniform, equal treatment of each container.* Steam and water systems are so designed and installed on each *UNIT* that the temperatures in all areas of the *Unit* is exactly uniform.

CANNING MACHINERY COMPANY

PORTLAND, OREGON 4333 S. W. LIBERTY ★ SAN FRANCISCO, CALIF. 244 CALIFORNIA STREET ★ CHICAGO, ILLINOIS 1807 W. NORTH AVE. ★ FLEMING, NEW YORK POST OFFICE BOX 247

York City. No. 2,765,599. Oct. 9, 1956.

Carton-Opener Comprising Gripping Means, Plunger—C. E. Kerr, Hoopeston, Ill., to Food Machinery & Chemical Corp., San Jose, Calif. No. 2,765,715. Oct. 9, 1956.

Bag-Filler With Frame, Filling Spout, Clamp Assembly, Retaining Basket With Evacuable Shroud—C. F. Carter, Danville, Ill. No. 2,765,816. Oct. 9, 1956.

Dispenser Consisting of Plastic Container Having Plastic Closure Separable by Finger Operation—E. F. Tupper, Upton, Mass. No. 2,765,831. Oct. 9, 1956.

Handle for Milk Cartons Comprising L-Shaped Bodies, Resilient Lip, Base Web— H. L. Bennington, Columbus, Ohio. No. 2,765,969. Oct. 9, 1956.

Carton-Carrier Unit Comprising Carton Support, Feed Device, Actuating Means, Strip Feeder, Folder, Stapling Device —W. B. Fahrenbach, Oakland, and F. B. Stone, San Anselmo, Calif. to Edlo, Inc., San Francisco. No. 2,766,567. Oct. 16, 1956.

Plastic-Container That Permits Second Like Container to be Nested Within—D. W. Hill, Ladue, Mo. to Crown Cork & Seal Co., Inc., Baltimore. No. 2,768,667. Oct. 30, 1956.

Clip-Applying Device Having Means Shaped to Provide a Recess into Which Bag Necks Can Be Inserted, Means for Swinging Jaws Toward an Anvil—E. R. Berluti, Saginaw, Mich. No. 2,769,978. Nov. 13, 1956.

Packaging Ice Cream by Abutting Two Containers Against One Another, Reducing Volume of Confined Space to Increase Density of Ice Cream —M. S. Afflerbaugh, Newport Beach, Calif. No. 2,771,369. Nov. 20, 1956.

Wrapping Meat in Ply of Transparent Film Consisting of Ester Plasticizer, Rubber Hydrochloride, Hydrophilic Material to Preserve red Color.—C. M. Carson, Cuyahoga Falls, Ohio to Goodyear Tire & Rubber Co. No. 2,772,172. Nov. 27, 1956.

NEW . . . FILLING MACHINE

Hope ESTABLISHED SINCE 1908

TYPE 15MS

. . . You can buy several for less than the cost of one big machine

Another first for Hope . . . This new, small, streamlined floor model accurately handles liquid, viscous and semi-solid products quickly and at the lowest possible cost! Excellent for pilot runs, small operations, laboratory testing, small batches and short production runs of a color or product.

WRITE FOR DETAILS

HOPE MACHINE COMPANY

9400-40 STATE ROAD • PHILA. 14, PA.

Strahman AUTOMATIC WATER-SAVER SPRAY NOZZLE

Ideal for Dairy and Food Industries

The Strahman Spray Nozzle does a better job with the least amount of water. This precision made nozzle enables the operator to get any type stream of water to do his job by simply pressing the lever. A soft spray is sent forth with slight pressure on the lever, and a strong straight stream may be had by pushing the lever all the way down. This convenient control of the wash water assures better cleaning with a lot less effort. The nozzle automatically shuts off the moment the lever is released, thereby eliminating all waste of water.

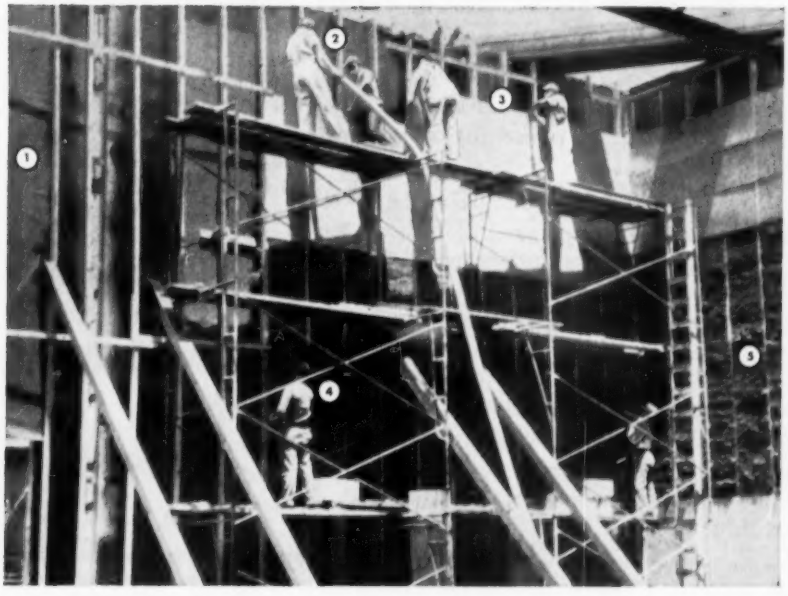
RENEWABLE RUBBER COVER. The sturdy cover protects the nozzle and your equipment against knocks and dents. When the cover becomes worn, replace it with a new one.

CONSULT YOUR DEALER

STRAHMAN VALVES, INC., 16 HUDSON STREET, NEW YORK 13, U. S. A.

PALCO WOOL®

THE VOID-FREE INSULATION



Job photo shows five construction steps: 1—Vapor barrier on warm side of wall. 2—*Palco Wool* being applied by void-free method (described fully in new Refrigeration Insulation Manual). 3—Temporary retainer for next course of *Palco Wool* being nailed to studs. 4—Insulation being inspected for void-free fill in wall area exposed by removal of temporary retainer. 5—Self-supporting *Palco Wool* in place. Note how temporary retainer has been removed from all but top area, while interior finish is being placed at bottom of 27 ft. wall.

NO POCKETS—NO VOIDS

Entire wall is insulated before interior finish is applied. Self-supporting *Palco Wool* is then inspected to eliminate any possibility of pockets or voids.

NO JOINTS

Palco Wool forms a continuous insulating barrier. As a uniform unbroken mass, it fills every nook and cranny—hugs every surface. With *Palco Wool*, there are no problems of heat leaks due to improper fitting at edges and around structural members.

NO SETTLEMENT

Examine *Palco Wool* fibers. You will see the corkscrew-like structure which gives lifetime resilience and freedom from settlement.

NO TRAPPED MOISTURE

Palco Wool is impervious to moisture effects and deterioration. It is installed with no intermediate vapor dams to trap moisture.

NO CONVECTION CURRENT LOSSES

At recommended density of only 4.5 lbs. per cu. ft., it displaces so much air and breaks it up so completely that convection currents are virtually eliminated.

see our catalog in SWEET'S INDUSTRIAL CONSTRUCTION FILE or write for copy

SEE THE NEW REFRIGERATION INSULATION MANUAL IN SWEET'S INDUSTRIAL CONSTRUCTION FILE OR SEND COUPON AT RIGHT FOR YOUR FREE COPY

THE PACIFIC LUMBER COMPANY

PALCO INSULATION WOOL®

100 BUSH STREET, SAN FRANCISCO 4, CALIFORNIA

THE PACIFIC LUMBER COMPANY

Room No. 2404 601

100 Bush Street, San Francisco 4, California

Please send me, without obligation:

- ☐ New complete Refrigeration Insulation Manual
- ☐ Sample of *Palco Wool* Insulation
- ☐ In-place test data on insulated structures

Name_____

Title_____

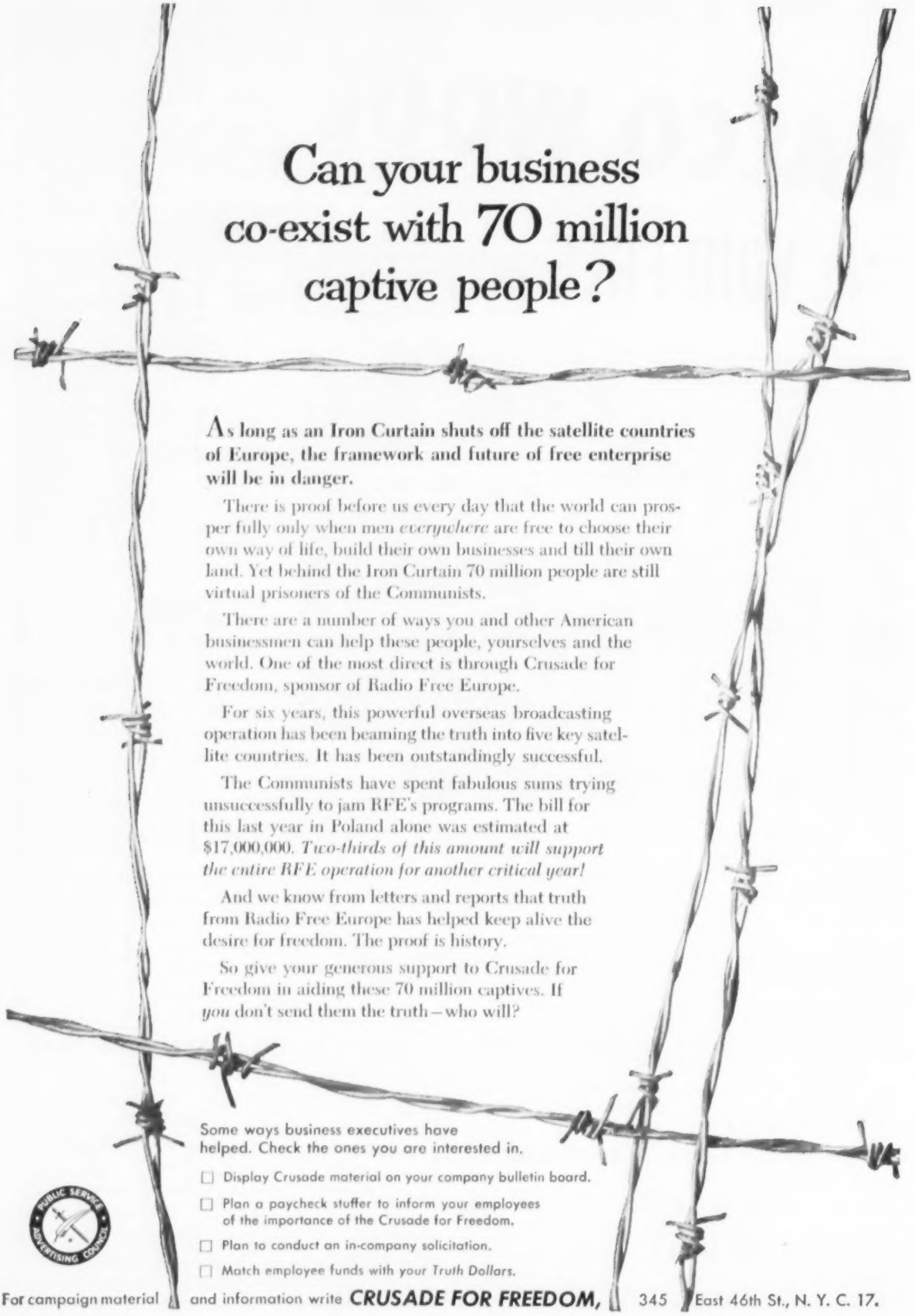
Company_____

Address_____

City_____ Zone_____ State_____

For more data, circle this page number on card at back →

Can your business co-exist with 70 million captive people?



As long as an Iron Curtain shuts off the satellite countries of Europe, the framework and future of free enterprise will be in danger.

There is proof before us every day that the world can prosper fully only when men *everywhere* are free to choose their own way of life, build their own businesses and till their own land. Yet behind the Iron Curtain 70 million people are still virtual prisoners of the Communists.

There are a number of ways you and other American businessmen can help these people, yourselves and the world. One of the most direct is through Crusade for Freedom, sponsor of Radio Free Europe.

For six years, this powerful overseas broadcasting operation has been beaming the truth into five key satellite countries. It has been outstandingly successful.

The Communists have spent fabulous sums trying unsuccessfully to jam RFE's programs. The bill for this last year in Poland alone was estimated at $17,000,000. *Two-thirds of this amount will support the entire RFE operation for another critical year!*

And we know from letters and reports that truth from Radio Free Europe has helped keep alive the desire for freedom. The proof is history.

So give your generous support to Crusade for Freedom in aiding these 70 million captives. If *you* don't send them the truth—who will?

Some ways business executives have helped. Check the ones you are interested in.

- ☐ Display Crusade material on your company bulletin board.
- ☐ Plan a paycheck stuffer to inform your employees of the importance of the Crusade for Freedom.
- ☐ Plan to conduct an in-company solicitation.
- ☐ Match employee funds with your *Truth Dollars*.

PUBLIC SERVICE ADVERTISING COUNCIL

For campaign material and information write **CRUSADE FOR FREEDOM,** 345 East 46th St., N. Y. C. 17.

Nach Deutschland zurück ?

Als ein führendes deutsches Nahrungsmittel-Werk suchen wir einen hochbefähigten, in der Praxis der Massen-Produktion erprobten und in moderner Menschenführung voll bewährten

FOOD-ENGINEER

als Betriebs-Direktor

für unser süddeutsches Haupt- und Stammwerk mit über 1000 Arbeitskräften. Ausführliche Zuschriften mit neuerem Photo und Referenzen erbeten an unseren Industrieberater

MEYER-MARK

Berchtesgaden, Germany

Wenn Sie der Gesuchte nicht sind – vielleicht kennen Sie ihn?

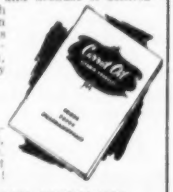
WHERE TO

- **STORE** Frozen Foods
- **BUY** Ingredients, Equipment, Parts, Services

CARROT OIL makes food golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A activity.

Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A activity of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.



SEND FOR BOOKLET

New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

NUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitley, Ind.

QUAKER CITY COLD STORAGE CO., INC.

PHILADELPHIA, PA.

3 WAREHOUSE LOCATIONS

Proper Temperature for Frozen Foods

EMPLOYMENT OPPORTUNITIES

NATIONAL COVERAGE

The Advertisements in this section include all employment opportunities—executive, management, technical, selling, office, skilled, manual, etc.

Positions Vacant	Civil Service Opportunities	Employment Services
Positions Wanted	Selling Opportunities Wanted	Employment Agencies
Part Time Work	Selling Opportunities Offered	Labor Bureaus

DISPLAYED ———**RATES**——— **UNDISPLAYED**

The advertising rate is $18.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

$1.50 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Box Numbers—counts as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

Send NEW ADS to FOOD ENGINEERING, 330 W. 42nd St., N. Y. 36, N. Y., for April issue closing Mar. 27th.

FOOD TECHNOLOGIST—CHEMIST

Experienced in research and development preferably in coffee or flavor industry. Assignment will be to guide ambitious program for young, aggressive company—an industry-leading firm, located in Eastern Pennsylvania. Working conditions excellent—new air-conditioned plant in pleasant suburban area. The opportunity is challenging—the future sound. Send details on education, experience and salary requirements to

P-4485, Food Engineering,
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

ORGANIC CHEMIST or BIO-CHEMIST

Ph.D.—recent graduate or experience in food research or development preferred. Experience in related organic fields acceptable. Openings in Minneapolis. Excellent future with multi-plant firm. Employer pays our fee and expenses. Send resume and recent photo to H. A. Jensen.

WALKER EMPLOYMENT SERVICE
212 So. 7th Street, Minneapolis, 2, Minn.

SOLUBLE COFFEE TECHNICIANS

Chemists, engineers, or technicians for several responsible positions in instant coffee productions, process development, quality control. Exceptional opportunities for alert, ambitious and experienced men.

P-4319, Food Engineering,
Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

WE NEED

FOOD TECHNOLOGISTS and FOOD CANNNING CANDIDATES
—junior to top-level

Call, write or wire:
Gladys Hunting (Consultant)
Drake Personnel, Inc.
220 S. State St., Chicago 4, Ill.
HArrison 7-8600

REPLIES (Box No.): Address to office nearest you c/o This publication Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

EMPLOYMENT SERVICE

Salaried Personnel. $5,000-$30,000. This confidential service established 1927 is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F., P. O. Box 674, Manchester, Vermont.

SELLING OPPORTUNITIES OFFERED

Manufacturer's Representatives and Distributors—wanted to handle sales and service of miniature (¼ H.P. up to 5 H.P.) electric steam generators up to 100 lbs. pressure—each unit bearing a Registered National Board of Boiler and P.V.I. Number, individually inspected under the miniature boiler code. We have specialized in this field for 10 years and desire only men who know and work with steam, or equipment requiring steam for its operation. Please reply RW-4364, Food Engineering.

Wanted: Sales Representative or Sales Engineer for New England Territory by prominent dairy and food machinery manufacturer operating nationally. In replying give full information on education, previous employment and income requirements. Enclose photograph. RW-4304, Food Engineering.

WHEN

Answering Advertisements

PLEASE *do not send original letters, certificates or photographs. We cannot be responsible for their return. Please send photostat or carbon copies.*

POSITIONS WANTED

Sanitarian seeks additional food processors in New York-New Jersey metropolitan area needing part-time assistance with their plant sanitation control. PW-4515, Food Engineering.

Baking Technologist, young, personable, seeks responsible position as Technical Sales Representative with basic ingredient manufacturer. Extensive background in prepared mix technology. Also, unusual technical knowledge of commercial biscuits and crackers. Can help customers to utilize new ingredients, develop new products, etc. Personal knowledge of European baking market. Will travel U. S. and overseas. PW-4511, Food Engineering.

Plant manager; multi-plant experience, canned chicken products, frozen meat pie, fruit pies and evis. of turkeys and fowl. Heavy experience in the above products. PW-4301, Food Engineering.

Food Technologist. M.I.T. graduate. Masters Degree. 20 years experience research and development. Creative ability and imagination. Several patents. Vegetable canning and perishable preservation. Desires challenging position. Age 49, married, children. PW-4500, Food Engineering.

Production & Research Chemist, with extensive experience in manufacture, development, control, of a wide line of confectionery and chocolate products, desserts, cereal products, and other foods, as well as laboratory direction, desires a position of responsibility. PW-4457, Food Engineering.

Food Technologist—Ph.D. 3 years experience in food research and product development of wide variety of food specialties. Seek permanent position with progressive manufacturer. PW-4448, Food Engineering.

Asset to any organization—Coordinator to Management, Production and Laboratory. Food Technologist and Chief Chemist with 11 years successful experience in research, product development and improvement. Raw material and finished product specifications. Preserves, dry mixes, spaghetti, canned items, tomato products, spices, etc. Presently employed. Not interested in run-of-the-mill position or salary. PW-4424, Food Engineering.

PROJECT MANAGER

Development Engineering in Food Processing Field

Major established company located in metropolitan NY area (a leader in its field for over 50 years) is presently expanding its activities in the development of new processes and equipment in the food processing field.

The man we are seeking will have complete charge of research and development engineering of major projects. He will be responsible for all work from research through pilot production plants.

Requirements:

1. MS or PhD degree preferred.
2. Sound technical background in chemical engineering or associated technical training in the food processing equipment industry.
3. Must have creative drive, vision and the ability to guide the projects through new developments.

SALARY: $12,000-$16,000

Please send complete resume to:

P-4388 Food Engineering
Classified Advertising Division
P. O. Box 12, N. Y. 36, N. Y.

EXPERIENCED ENGINEERS AND CHEMISTS

Age no barrier

Jobs available for mechanical and chemical engineers and chemists. These permanent positions are in the research division of a large dairy and food organization. The work covers a wide range of activities from fundamental studies to development work on existing processes and products as well as the development of new products. A good basic knowledge is necessary in addition to creative ability and a real desire to succeed. Attractive salary and benefits together with excellent working and living conditions are offered in a smaller division of a stable industry. Applications confidential.

Send resume to

J. C. MAUER
Research Laboratories Division,
National Dairy Products Corporation
Oakdale, Long Island, New York

ENGINEERING DIRECTOR

Expansion plans of a rapidly growing food processing plant with 400 employees, located in suburban Philadelphia creates this challenging new position for an imaginative graduate mechanical engineer.

Unusual opportunity for a man with initiative to develop forward looking plans for the renovation and expansion of plant and distribution facilities. Experience in truck fleet maintenance desirable.

This is a permanent position and will provide broad application of diversified engineering skills. Excellent salary, management incentive bonus and complete employee benefits for you and your family. Contact our Personnel Department.

Martin Century Farms Milk Company
LANSDALE, PA.

SEARCHLIGHT SECTION

Classified Advertising

BUSINESS OPPORTUNITIES — EQUIPMENT - USED or RESALE

UNDISPLAYED ——RATES—— *DISPLAYED*

$1.50 a line, minimum 3 lines. To figure advance payment count 5 average words as a line. BOX NUMBERS count as one line additional in undisplayed ads.

DISCOUNT OF 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

The advertising rate is $13.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request. AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

Send NEW ADS or Inquiries to Classified Advertising Division of Food Engineering, P. O. Box 12, N. Y. 36, N. Y. April issue closes March 27th.

FOOD TECHNOLOGIST

Nationally known food processor with headquarters in western New York has staff openings for graduate bio-chemists and food technologists with minimum of 1 year college bacteriology. Initial assignment with Central Quality Control Department. Advancement opportunities leading to plant quality control and production supervisory responsibilities. Salary commensurate with experience. Send complete resume and salary requirements to:

P-4390, Food Engineering,
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

RESEARCH CHEMIST

wanted, with thorough knowledge of protein, carbohydrate, and general organic chemistry, mostly in relation to foods, by a long established firm on the Chicago Northwest side.

M.S. or Ph.D. preferred but degree is secondary to resourcefulness in the practical approach to problems.

Send complete resume and state salary expected to . . .

P-4401, Food Engineering,
520 N. Michigan Ave., Chicago 11, Ill.

FOOD PLANT SUPERVISOR

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- CRCO model S-1 Preheater
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Dryer: Bowen lab. spray, st. steel.
Dryer: Direct Heat 4' x 20'.
Dryer: Stokes rotary vacuum 2½ x 8'.
Dryer: Atmospheric double drum to 120".
Dryer: Nordyke-Marmon 120 bu.
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Fillers: M & S for cans 6 and 10 pocket, st. st.
Fillers, powder: Speedee, Triangle, Stokes & Smith, Ferguson, Gump.
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Food Machinery Blancher Figure 2304, 12' x 50', 2 H.P. motor
Sinclair Scott Rod Washer, ½ H.P. motor
Blancher 30' Stainless Steel Belt, 2 H.P. motor
Belt Conveyor 12" x 10', ¼ H.P. motor
Standard Brands Bean Breaker, 2 H.P. motor
Conveyor 12' x 11", 1/6 H.P. motor
Battle Creek Wrapping Machine Model 46, 1 H.P. motor
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Food Machinery Filler Figure 4450 Model 15, 10' Conveyor, carton closing device & auxiliary opener
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Ayars Carton Filler ½ H.P. motor
Monitor Washer 4' x 28"
2 Belt Conveyors, rubber, 11" x 8', 14" x 18'
Belt Conveyor, Stainless Steel, 18" x 9'
Conveyor 7" x 12', ½ H.P. motor
Gooseneck Conveyor 13" x 21'.
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4 Waukesha Gasoline Engines 108 H.P.
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Sealed bids on any or all of the above items will be opened at the office of the undersigned at 11 A.M. on April 1, 1957, terms, cash on delivery. Envelopes containing bids should be plainly marked—SEALED BID. NOT TO BE OPENED UNTIL 11 A.M. ON April 1, 1957.

We reserve the right to reject any and all bids. If identical bids are received, the Bank will determine which, if any, will be accepted.

For appointment to inspect the equipment at the Shelter Island, N. Y. plant, telephone or write to the undersigned.

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1—Niagara #95-36 Pressure Filter, 304 S.S., 92 sq. ft.
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- Horix 18 spout Rotacy S.S. Filler
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- AT&M 42" S.S. Centrifuge Perforated Basket
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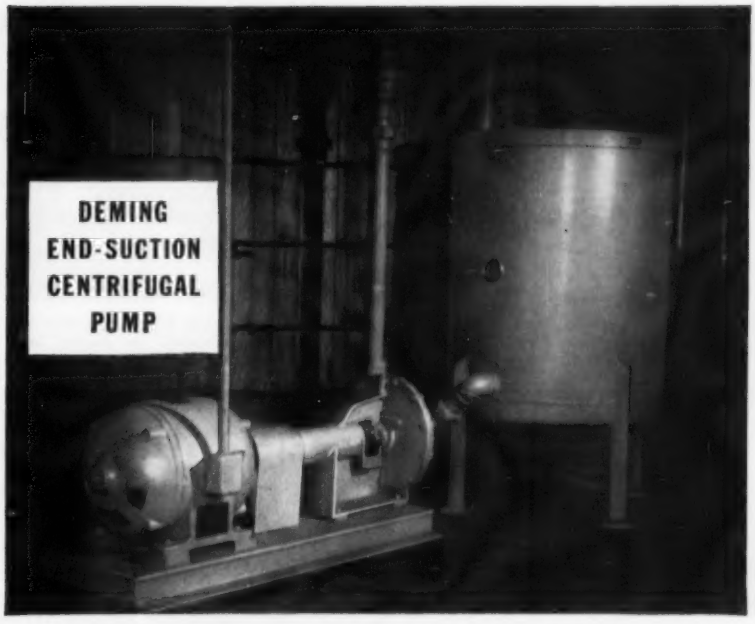

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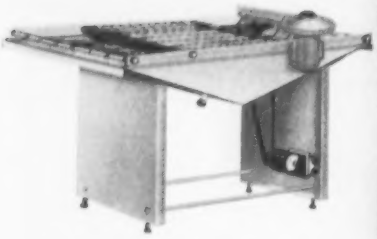

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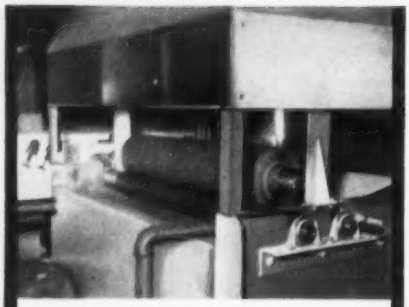

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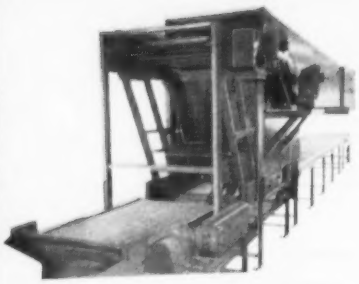

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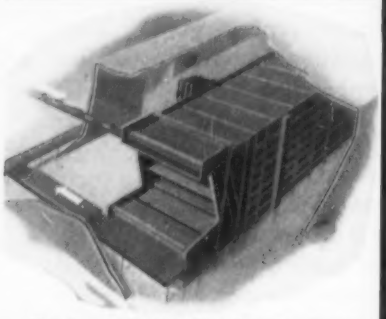

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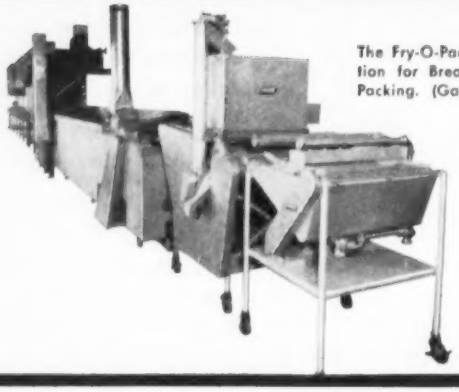

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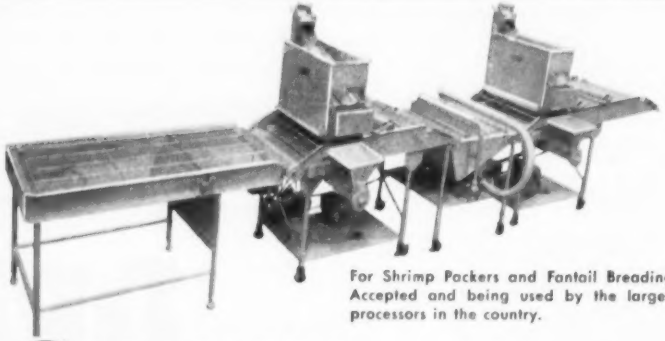

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4f	29	56-7	91j	121	141b	158	176	208a	220a
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4h	32	59	96	126	143a	160	179	208	220c
6	35	60	101	128	143b	161	181a	211a	221
8	36	61	102	130	144	162	181b	211b	229
9	37	62	104	131	144a	164	182	212a	230
10	38	64	105	134	144b	165	183	212b	230a
11	41	77	106a	135	144c	166a	184	213	230b
12	42	78a	106b	135a	144d	166b	188	214a	230c
13	43	78b	109	135b	144e	167	190	214b	230d
14	44	84	110	135c	145	168	192	215a	230e
18	45	87	110a	135d	146a	168	196	215b	230f
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21	47	91a	110c	135f	148	169b	198-9	216b	232
23	48	91b	115	135g	149	169c	200a		

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These numbers correspond to numbers in text.

22A	123A	187C	195C	200B	203D	204A	2040	207N	208K
22B	123B	189A	195D	200C	203E	204B	207A	2070	208L
27A	123C	189B	195E	200D	203F	204C	207B	207P	208M
28A	123D	189C	195F	200E	203G	204D	207C	207Q	208N
79A	123E	189D	195G	200F	203H	204E	207D	208A	2080
79B	124A	191A	195H	200G	203I	204F	207E	208B	208P
79C	124B	191B	195I	200H	203J	204G	207F	208C	208Q
79D	124C	191C	195J	200I	203K	204H	207G	208D	211A
79E	124D	191D	195K	200J	203L	204I	207H	208E	211B
79F	124E	193A	196A	200K	203M	204J	207I	208F	211C
122A	124F	193B	196B	200L	203N	204K	207J	208G	211D
122B	186A	193C	196C	200M	2030	204L	207K	208H	211E
122C	186B	193D	196D	203A	203P	204M	207L	208I	211F
122D	187A	195A	196E	203B	203Q	204N	207M	208J	211G
122E	187B	195B	200A	203C					

☐ 1 yr. $2 ☐ 2 yrs. $3 ☐ 3 yrs. $4 Domestic rates only, for others, see p. 5

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Position ..... Product .....

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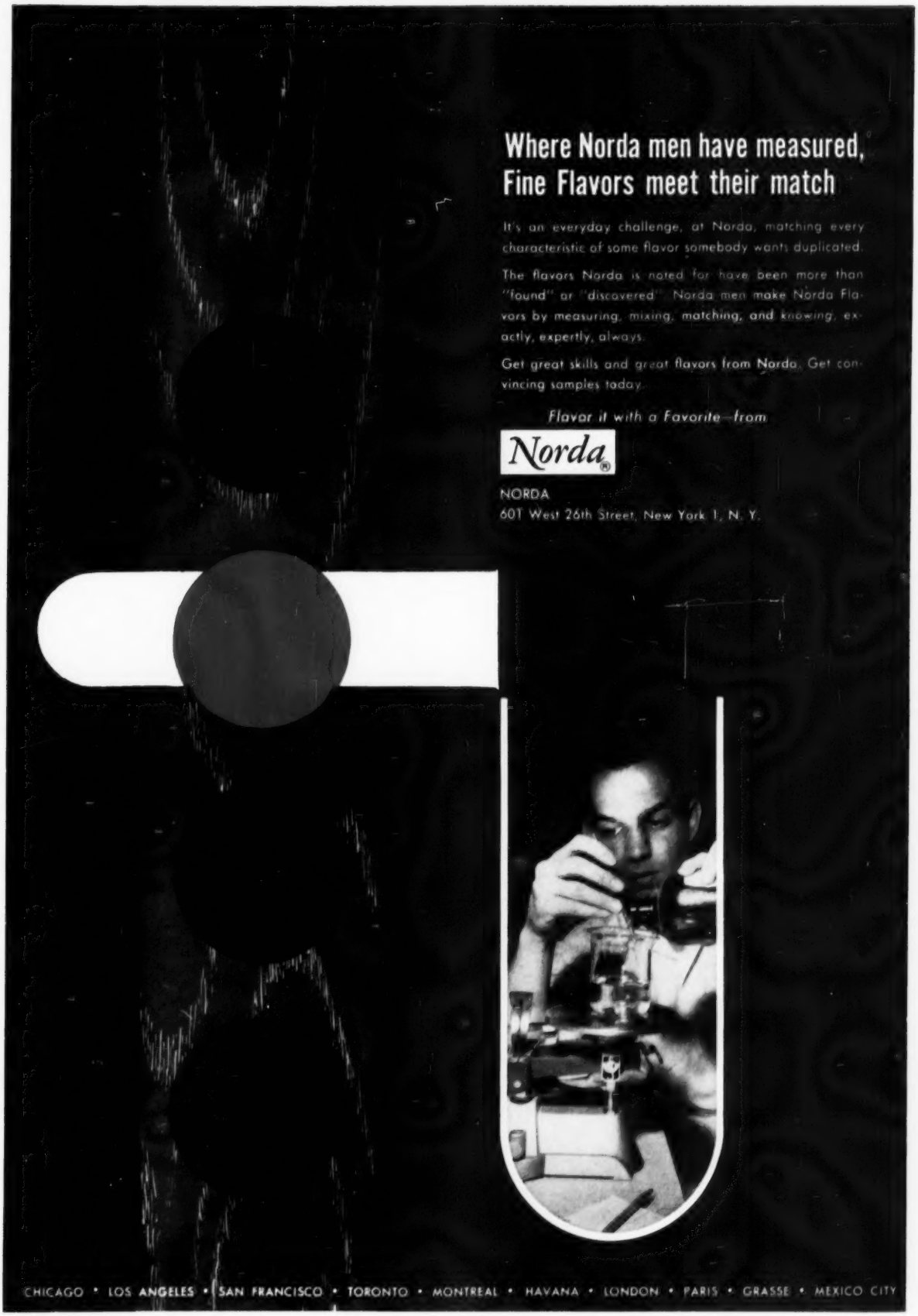

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